FLIGHT

First Aero Weekly in the World.

A Journal devoted to the Interests, Practice, and Progress of Aerial Locomotion and Transport.

OFFICIAL ORGAN OF THE ROYAL AERO CLUB OF THE UNITED KINGDOM.

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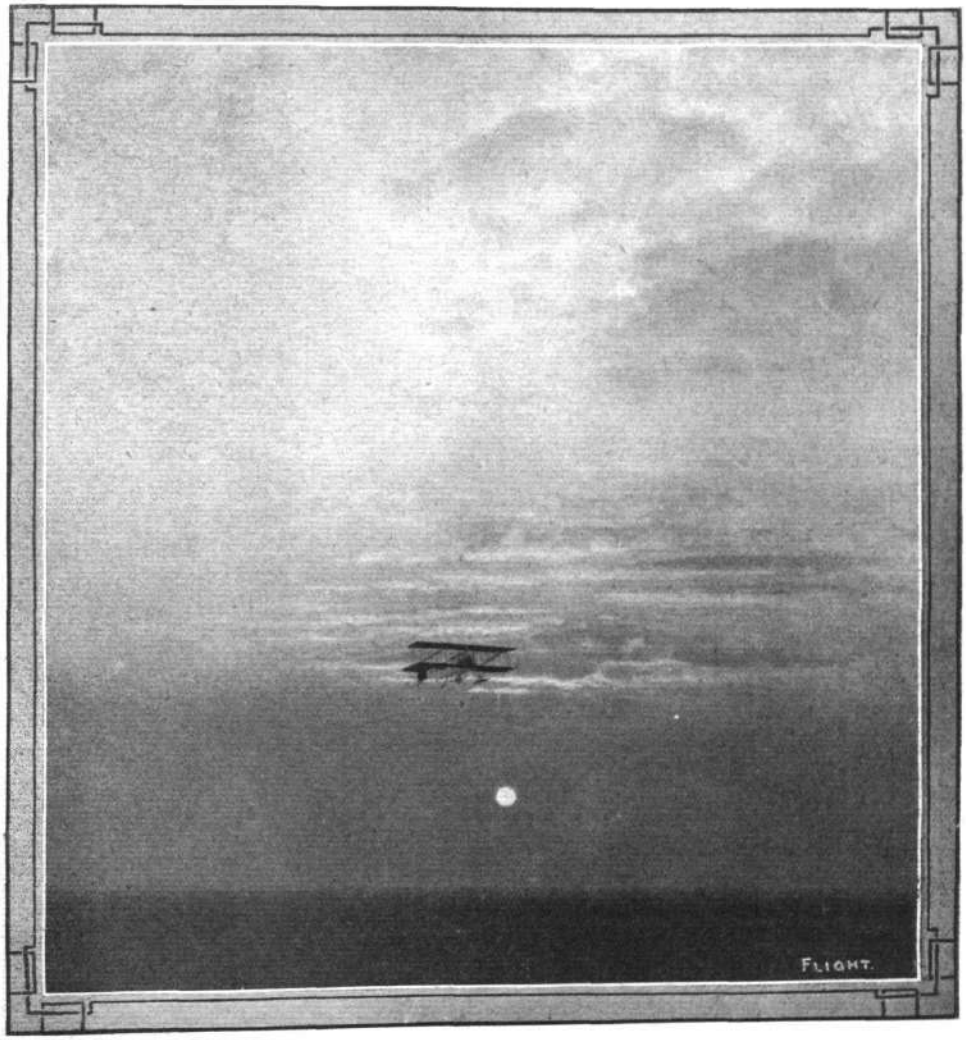


FLYING IN THE FACE OF THE SETTING SUN.—A "November setting," by Dr. William J. S. Lockyer, to Mr. Frank K. McClean and his Short biplane at the Royal Aero Club's ground, Eastchurch. This picture is a fine example of a genuine photograph, and was secured by Dr. Lockyer on the evening of November 5th just before sunset. It was on this machine that Mr. McClean has recently been making his long cross-country flights.

PRACTICAL VALUE OF THE AEROPLANE.

ONE of the most difficult things for the mind of the average "man in the street" to grasp in connection with the development of the science of flight is that the aeroplane has before it any real prospects of commercial success. Talk to him of the marvellous strides that have been made during the last three years in perfecting the heavier-than-air machine, tell him of the wonderful flights that have been made by this or that aviator, and he will, nine times out of ten, express plenty of academic interest, but will almost in the same breath ask, "*Cui bono?*" Flying is to him all very well as a spectacle and is a very wonderful thing in itself, but will never in the nature of things become anything else. People will get quite used to the idea of man doing something that it is apparently against all the natural laws for him to do—he was never intended by Nature to fly, and the mere fact that he is able to disregard her laws and to fly is marvellous for the moment. Later it will become commonplace and people will not cross the street to see the finest flight in all history. Then the aeroplane will die the death that comes to everything superfluous. It may just survive spasmodically as the toy of the wealthy man with money to waste and a foolish neck to risk, and, possibly, there will also survive certain military craft which will be devoted to the purposes of war. But, as for the commercial and industrial aeroplane, that—to our typical man—is beyond the wildest dreams of the imagination. Thus, in fact, reasons the average person who is content to live in the past and to breathe in the immediate present, but for whom to-morrow may take care of itself so long as he is not asked to tax his brain in the vain endeavour to probe into the possibilities of the future.

Even for the most dogmatic of reasoners who would aver that the aeroplane is a freak machine, with the barest possibilities for belligerent purposes and with none industrially, there are not wanting signs even at this very early stage of the history of the movement that the aeroplane is speedily destined to take its place among the other methods of locomotion and to enter at no very distant date into a life of useful ministration to the world's communal wants. Already, indeed, two or three cases have been recorded in our columns, including that of the French scheme for a service across the Sahara, and some other proposals of a similar nature which the French Minister of Colonies now has under consideration. Another sign is that a Company working one of the Eastern European oilfields has just placed an order for a machine to be used for inspection purposes by the manager of the field in question. No doubt our friend in the street will have read this news with a smile of pity for the manager who will have to make his journeys round the oilfield in the air instead of on terra firma; but this is simply because our friend does not know and has no practical powers of imagination. Fifteen years ago the same kind of man smiled in the same superior way when he saw the casual motor car clanking and snorting its way along the highway at the giddy speed of ten miles an hour. He himself would not have risked his precious life in the new-fangled contraption, and he deemed the pioneer of the movement only fit to be locked up in an asylum for the better protection of himself and of those whose existence on the highways was endangered. Well, things have developed, and the scoffer of a decade and a half ago now merely wonders how he ever managed to get on without his motor car! May he not be equally wrong regarding the aeroplane? We hold that not only *may* he be wrong but that he is just as far out in his estimate as he was in the case of the car. Have we not already seen the indications of this? Three years ago, people smiled at the latest American story which had it that the Brothers Wright had succeeded in flying quite long distances.

This was the kind of thing we were accustomed to hear from the "other side" and no one, except a few serious-minded enthusiasts, took any notice of it. Now, since Wilbur Wright came over and showed that the problem of man-flight had at last been solved, flying has become almost hackneyed. In place of the halting flights of half-a-mile or so that were naturally acclaimed as something wonderful, the limit of distance is that of the fuel carried. Flights of a hundred miles and over are as plentiful as blackberries in autumn—nobody thinks twice about them. The aeroplane has proved itself far more rapidly than we ourselves had ever dared to hope; and it now requires no great daring to prophesy that in another three years the uses to which it will be put will have multiplied to an extent that will place it in the running as an everyday method of locomotion.

An argument often heard when any attempt is made to convince the unbeliever of the possibilities of flight is that whatever may happen regarding countries that are undeveloped and in which conventional modes of conveyance are difficult or impossible, the aeroplane can never be of practical use in a country like our own where communications are good and where there exist such ample facilities for road and railway travel. The answer to this is that nowhere are facilities so good but that they might not be better. Everything on this earth is capable of improvement—methods of communication included. Let us take but a single crude instance quite close to one's own door—the Thames estuary. The resident of Margate, let us say, has occasion to visit Southend. As it is at present he has his choice of two evils. Either he can take the train to London, cross the river and take another train down—a matter of several hours of travelling and waiting for connections—or he can charter a boat and cross direct. The latter, while a considerable saving on the time occupied in doing the journey by train—will still take an hour or two, but given an efficient aeroplane—even as we know them to-day—he can get over in a fraction of that time.

To sum up, the possibilities of the future for the use of the aeroplane commercially are almost unbounded. In opening up new countries where there are neither railways nor roads, and for quick transit under circumstances which give the flying machine an advantage over train, motor or steamer, the possibilities are ample to ensure all the demand that could reasonably be desired for keeping in full swing an industry of every bit as great an import as any other industry the world has hitherto seen spring up in its midst. Then too, as has been the case with the automobile, the greater comfort and luxury of travel, combined with the still further extended freedom to go anywhere without arbitrary restraint, is bound to enable the industrial development to be hastened—in a manner otherwise impossible to anything like the same degree—as the direct outcome of the spending powers of the wealthy and leisured classes.

FLIGHT PIONEERS.

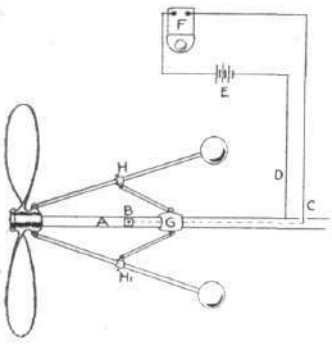
MR. W. E. McARDLE.

SPEED-ALARMS FOR FLYERS.

SOME MORE COMPETITIVE DESIGNS FOR OUR £5 PRIZE.

[22] I have pleasure in submitting a rough sketch for a simple speed alarm, which I think would prove effective.

Governor-balls are pivoted to a sliding collar, G, and to a revolving collar attached to a propeller, the whole being mounted on a hollow metallic tube, A.



The wind pressure on the propeller causes it to revolve, and this rotates the governor-balls which, by centrifugal force, fly apart, thus drawing the loose collar, G, along the bearing-tube, A.

The position of G on the shaft can be regulated by means of the collars and screws at H, H¹, and, therefore, for a given pressure, the collar, G, can be made to fall on the insulated contact point, B.

When this takes place an electric circuit is completed, and this can be arranged to light a lamp, and to ring a bell, or sound a siren.

The electric circuit might be made by means of the magneto, or by accumulators, or a battery.

Blackburn. JOHN MILTON JEPSON.

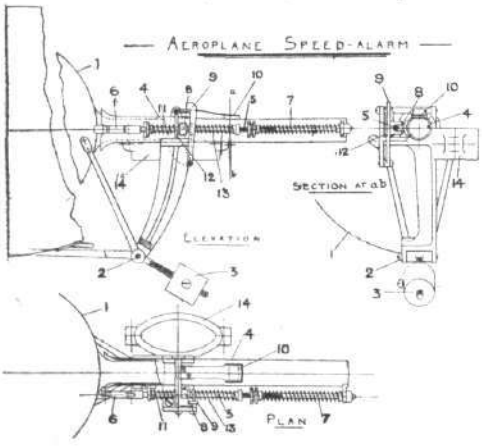
[23] In the accompanying sketch, A, B and C are musical reeds or whistles, which give three distinct notes. The path of the wind is shown by arrows. As the wind increases and is unable to get away through C it will spew over the partition into path, B, and in like turn, with increase of wind, over partition, B, into path, A.

J. H. WILKINS.

[24] I send you herewith a design for a speed-whistle, in which the pressure of the air on the blast-funnel is utilised to operate the valve mechanism.

The funnel, 1, is mounted on a swinging bracket, and is balanced about the axis, 2, by the weight, 3, so that the action will not be affected by any alteration of the flying angle of the machine. The neck of the funnel enters into the mouth of the whistle, 4, with enough clearance to allow the funnel to swing about, 2, so that the neck has a longitudinal motion of about $\frac{3}{16}$ in. The amount of this clearance of course depends upon the distance which can be allowed between 2 and the centre line of the whistle, 4.

A rod, 5, is mounted to slide in brackets at the side of the whistle, and is coupled to the funnel by the link, 6. As the speed of the machine rises, the correspondingly increased pressure on the funnel, 1, forces the funnel and the rod, 5, to the right against the adjustable spring, 7. The collar, 8, coming in contact with the fork at the back of the trigger, 9, moves it so as to release the valve, 10, which flies open under the action of the spring, 11, thus allowing the whistle to blow. If the speed is reduced, the spring, 7, causes the funnel and rod, 5, to move to the left, and the collar, 8, coming in contact with the fork, 12, closes the valve, which is then locked by the spring, 13, returning the trigger, 9, to its former position. Springs, 11 and 13, are, of course, very light, and need not interfere with the action of the main controlling spring, 7.



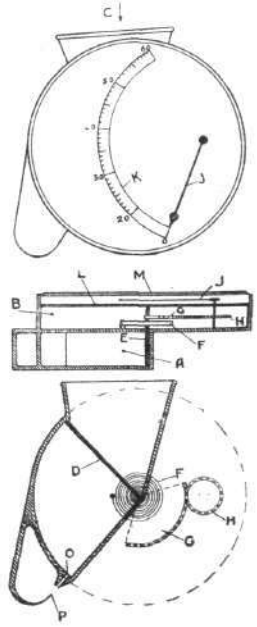
It seems to me that an alarm of this type, in which the warning is given suddenly, will be more likely to attract the pilot's attention than one which opens gradually, and which might pass unnoticed among the various other noises on an aeroplane. Moreover, it will be seen that, as the valve opens suddenly and closes slowly, the speed corresponding to the closing of the valve will be lower than at which it opens. Consequently, if set to open at the "speed limit," the pilot, when he has reduced the speed until the valve closes, will know that his speed is *below* this limit, and not on the border-line between "safe" and "unsafe" as might be the case with one which opened and closed at the same speed. Of course, if necessary, it would be possible by increasing the movement of the rod, 5, to open other valves lower down the pipe, and so alter the pitch of the note to correspond to various speeds, though this might lead to confusion, especially in the case of a pilot with no ear for music.

The alarm, as shown, is meant to be clamped to one of the vertical struts of a biplane by means of the clip, 14. But obviously, the instrument being self-contained, and working in any position, it could be fitted in desired manner.

Stockport. A. E. BEYNON.

[25] The three views represent my indicator diagrammatically. The speed-indicator can be placed in any convenient position horizontally, and is of a type that records the relative velocity of the aeroplane with the wind.

The body of the indicator consists of two chambers, A, containing a movable vane, and B, containing the recording-gear. The indicator is so placed that the funnel-shaped opening is in front, so that the wind enters as at C, the pressure of the wind being taken by the vane, D. This vane is pivoted at one side, E, and is controlled by the spiral spring, F. Fixed to the pivot, E, is a toothed segment, G, which is in gear with a pinion, H, which operates the pointer, J, moving over the scale, K, which is marked on the dial, L, the whole being cased in by the glass, M.



The pressure of the wind entering at C, will cause the vane, D, to move until the wind pressure is balanced by the tension of the spring, F. The movement of the vane will cause the pointer to take up a definite position over the scale, which has been previously carefully calibrated. The pressure of the wind will, therefore, actually register in miles per hour, or any other convenient notation, the relative velocity between the aeroplane and the wind.

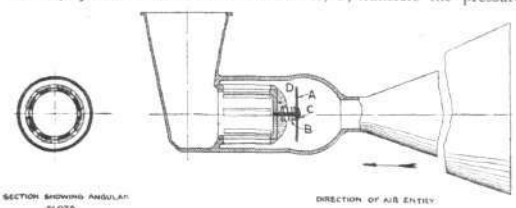
This gauge may be arranged so that at any pre-arranged speed (*i.e.*, wind pressure) the vane, D, will have moved to uncover a port as shown at O, which will allow the air to escape with a high velocity. The air is directed so as to impinge upon the edge of the whistle, P, so that audible warning of any excess speed is given.

The advantages claimed for this gauge are :—

1. Accuracy.
2. Simplicity.
3. *All* speeds recorded.
4. *Double* record of excess speed.
5. Accuracy is not affected by slope of aeroplane.
6. Extreme lightness, being made entirely from aluminium.

Dundalk. R. PENTONY.

[26] The sound-producing mechanism of this instrument is on the principle of the steam siren, and consists of a cylindrical drum with angular slots revolving in a fixed drum also provided with angular slots. The inner or loose drum revolves rapidly from a rush of air, and the resultant sound is directed by the small conical hood. The air velocity at which the siren shall operate is governed by the plate, A, and the spring, B The action of this mechanism is as follows: the spring, B, exerts a pressure against the plate, A, which, by means of the fulcrum washer, C, transfers the pressure



and its resultant friction to the face, D, of the (revolving) drum and the adjacent face of the fixed drum, thus preventing the rotation of the loose drum; but at a predetermined critical speed the excessive rush of air forces back the plate and its spring; the pressure on the fulcrum washer is thus released, and, the inner drum being freed, commences to revolve and produces the warning sound. The pressure exerted by the spring is adjusted by any convenient means, and the air velocity through the inlet neck for a given speed being known, also the area of the plate and strength of spring, the initial adjustment can be worked out mathematically.

Coventry. F. FORD.

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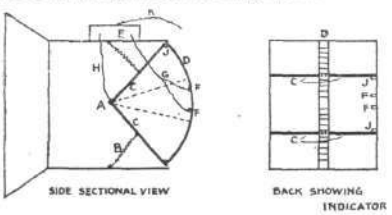
[27] *Re* prize competition for aeroplane speed indicator and alarm. I enclose sketch of my idea. Speed would be shown on indicator, as sketch, and if necessary the flaps could at a certain point be made to press a button and ring an electric bell when the rate of travelling had reached danger point.



The idea of having two flaps is that one would check the accuracy of the other.

Box form with funnel-shaped opening to conduct air pressure on to flaps, C.

A, rod on which flaps are hinged; B, B, springs tested for air pressure in conjunction with indicator at back, registering miles per hour; C, C, hinged flaps on which air pressure works, the greater the speed, the ends of flaps will be driven more to centre of indicator; D, D, slightly curved regulator in centre of back; pointers attached to flaps, C, will indicate rate of travelling.

Figures, indicator, &c., all to be painted in good contrasting colours so as to be easily read. Figures marked are only for illustration, any, of course, could be used as required.

Attachment for alarm:—E, box containing batteries for electric bell; F, metal contact; G, wire from battery to contact; H, wire from battery carried to rod, A, and along flap, C, to J, metal contact, which, when danger point was reached, would complete circuit with F and cause bell to ring; K, wire to electric bell, which would be fixed in most suitable place near head of aviator.

Wires, H and G, would be fixed to side of box.

Of course, the register would not show miles per hour from place to place, as travelling with and against the wind would affect the instrument. It would really denote the strain on the machine as it increased, the bell ringing when danger point had been reached.

Margate. W. READ.

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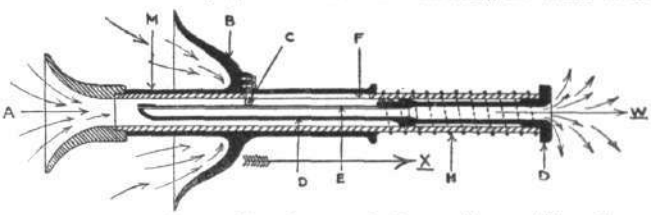
[28] We enclose a design for automatic alarm for aeroplanes, which we hope will meet with your approval.

This sectional view shows *one form* of apparatus. The slide, M, is free to move in the direction of arrow, X, against light spiral spring, H, the air being caught by the bell, B. Attached to slide is a small roller, C, which travels along the reed, E, and by lengthening or shortening the reed produces a deep or sharp note. The air to work the reed enters through A, and passing through tube, M, vibrates the reed, and then passes out at W. The slot, F, is to enable the roller, C, to move in or out on top of reed (without loss of air), the sliding action varying as the pressure of wind on B.

The great difficulty in solving this problem successfully lies in the fact that the pilot requires to know exactly the speed he is travelling relative to the earth, no matter what may be the wind pressure against him. Example:—

A whistle is set to sound at 40 miles an hour speed. When travelling against a head wind at 20 miles an hour (the wind travelling against him at 20 miles an hour), the whistle would



register 40 miles an hour speed, when machine would be stationary relative to the earth. When travelling with the wind at 20 miles an hour, wind also travelling at 20 miles an hour, the machine would be travelling relative to the earth at 40 miles an hour. The whistle in this case would register as at no speed. We may be wrong in our surmises, and would like, if wrong, to have this matter discussed.

Belfast. JOHN G. MERNE and W. LITTLE.

DURALUMIN.

THE NEW "V. S. AND M." LIGHT AND STRONG ALLOY.

FOR very many purposes the new aluminium alloy now being introduced by the Electric and Ordnance Accessories Co. is likely to prove invaluable from all accounts to the arts and crafts of civilisation; and apparently no branches of engineering are likely to benefit more from it than the automobile and the aeronautic industries. That which is so remarkable about this latest Vickers, Sons and Maxim production is that, although it contains over 90 per cent. of aluminium, and therefore has as low a specific gravity as 2·8, with a melting point of 650° Cent. (1,202° Fahr.), yet its strength and hardness can virtually be made that of mild steel, and it is capable of taking a natural high polish which obviates any necessity for nickel plating or similar final finish.

Some idea of the toughness of the new alloy is conveyed when it is stated that by the special treatment that gives it its special properties a tensile strength of no less than 40 tons per square inch can be obtained with very little elongation at all. Similarly by different treatment this alloy can be given a tensile strength of about 30 tons per square inch, with a 15 per cent. elongation in 2 ins., or alternatively a tensile strength of 25 tons per square inch, with 20 per cent. elongation in 2 ins. Curiously enough, however, from some points of view, it is not recommended in the form of castings, so that the makers only supply it in finished form; such, for instance, as plates, bars, screws, forgings, stampings, tubes, or wire.

Other beneficial properties possessed by it are fairly numerous, quite the most important of these from a general point of view being that it well withstands atmospheric influences and is but very little affected either by fresh water or by sea water. These points alone are of course greatly in its favour for automobile work, including motor boats equally with cars and cycles, as well as for use in the construction of air-ships and aeroplanes. Then, again, it is non-magnetic, which is distinctly useful from the point of view of the electrician, to whom also the fact that it is unaffected by mercury is not without significance.

In sending us these particulars with reference to "Duralumin" the Electric and Ordnance Accessories Co., who are just commencing to manufacture it commercially, tell us that they will very soon be in a position to execute orders, and that full price lists are now being compiled.

A HOME-MADE MODEL FOR HALF-A-CROWN.

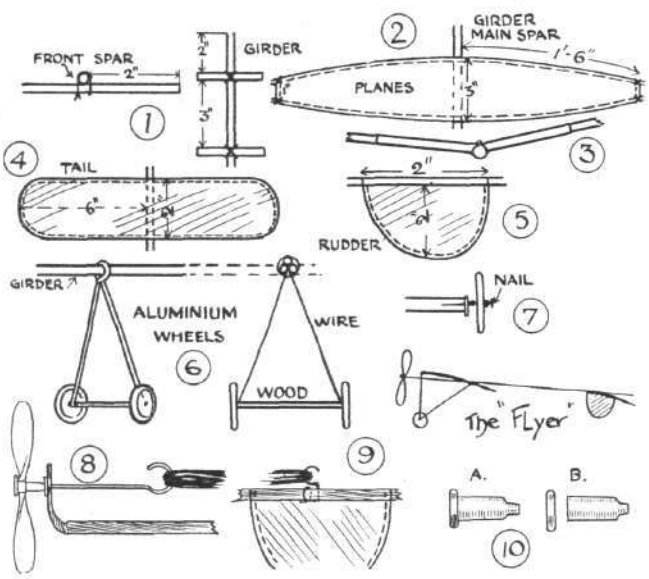
By T. M. GARROD.

JUDGING by the nature of the enquiries made by several of your correspondents, I think there must be many amateur model makers whose real requirements would be best met by a description of the sort of machine that I have found to give excellent results, although it only costs about half-a-crown to build, and is of the simplest possible construction. For the benefit of your other readers, I give a few sketches of its construction, which should be adequate for the purposes of anyone who has sufficient ingenuity to construct a successful model at all.

The first materials required are two feet of ¼ in. aluminium tubing, which can be obtained for 6*d*., and one foot of a smaller sized tubing, which will fit inside the larger piece; this will cost 4*d*. Two pieces of this latter tubing are cut off, each 2 ins. long, and these are lashed at right angles to the larger piece of tubing as shown in Fig. 1. The larger piece of tubing forms the main longitudinal girder, while the cross-pieces serve as the sockets for the transverse-spars of the main wings. In order to facilitate fastening the sockets to the girder, the tubes may be slightly pinched at the joint so as to prevent them turning round. Into the sockets thus formed four pieces of flexible wood must be fitted, each piece being 1 ft. 6 in. long. The extremities of these spars are drawn together until they are only an inch apart, and they are then braced in that position by a rib lashed between them. The rib can be made of wood ¼ in. by $\frac{1}{16}$ in. in section. In the centre the chord of the plane is 3 in., for that is the distance apart of the sockets (Fig. 2). The wings are finished by pasting stiff paper on to the frame thus formed, and when this has been done, a dihedral angle may be obtained by slightly bending the sockets (Fig. 3). The front spar of the planes is 2 in. from the girder as shown in Fig. 1.

The next operation is to construct a tail plane, which may be very conveniently made of cane to the dimensions shown in Fig. 4. It is surfaced with paper and attached to the girder an inch from the extremity. Another cane member, bent into a half hoop and surfaced with paper (Fig. 5), if fixed beneath the tail will serve the dual purpose of a rudder and a skid.

The next detail is the chassis, which may be made of a piece of galvanised wire bent and fixed to the frame as shown in Fig. 6.



The axle is made of wood, and little aluminium wheels are fixed to the axle by means of nails (Fig. 7).

The final fitting is the propeller, and Fig. 8 shows its bearing and the shaft, which is a piece of bicycle spoke. The thread on the other end is lengthened, and the nipple is cut in two pieces (Fig. 10), of which the larger is screwed on next to the bearing. An 8 in. Cochrane propeller is next screwed on and fastened by the smaller part of the divided nipple. Eight strands of elastic constitute the motor, and the anchorage, formed by a wire hook above the rudder, is shown in Fig. 9.

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Developments With the Isaacson Engine.

SINCE the Isaacson engine was exhibited at the last Olympia Flight Show, it has undergone considerable improvement, and the makers, feeling satisfied that they have now overcome all the difficulties, are arranging to have practical tests with the engine when fitted to an aeroplane.

During last week, one of the seven-cylinder engines was exhibited at the premises of the Bosch Co. in Newman Street, London, in order that those who are requiring a British-built motor might see the engine for themselves.

We hope to give further particulars regarding the engine very shortly.

The Etrich monoplane, with Austrian-Daimler engine, in flight at Wiener Neustadt. This is the aeroplane of which the German Government have ordered twenty replicas.

FROM THE BRITISH FLYING GROUNDS.

Royal Aero Club Grounds, Eastchurch.

ON Wednesday, the 16th inst., Mr. McClean, taking advantage of a temporary lull in the wind, brought out his Farman type "Short" machine at 4.30 p.m. It was getting dusk as he started away, and after flying for 15 minutes he was forced to descend, owing to complete darkness setting in.

On Thursday and Friday, the 17th and 18th inst., it was blowing a gale, and consequently there was no flying.

Mr. Jezzi intended going for his certificate this week-end had the conditions been anything like favourable, but he was forced to postpone the attempt.

Sunday was another day of wind and rain, and there was no flying.

On Monday, the 21st inst., the wind, though somewhat abated, was still far too strong to admit of flying until shortly after 3 o'clock. Mr. McClean brought out his Farman type "Short" biplane immediately, and at 3.20 got away. Rising to over 300 ft. he circled the course twice, flying at a nice angle, and at a good pace. He then made a wide detour round Stanford Hill, finally making off in the direction of Eastchurch. Skirting the village he headed for Leysdown, thence passing over the Swale and circling above Whitstable. Returning by way of Harty he there experienced an adverse current which caused the machine to drop some 100 ft. He quickly rose again, however, to between 300 ft. and 400 ft., ultimately effecting a good landing immediately outside his shed at 4 o'clock—after 40 mins. in the air.

Shortly afterwards, Mr. McClean was up again, this time carrying a passenger, with whom he proceeded in circuits round the ground some half-dozen times at about 50 ft. before landing—this time for the night.

Active preparations are on foot here for attempts on the cross-Channel flight for the Baron de Forest prize. Mr. Grace and Mr. McClean are both strongly fancied for this event from amongst the Eastchurch entrants, whilst Mr. Jezzi, we understand, also has serious designs on this prize.

Nor has the Michelin Cup been lost sight of here, and next month, weather permitting, should be an extremely busy one.

Brooklands Aerodrome.

PRACTICALLY the whole of the past week has been ideal flying weather, the frost making the surface of the ground hard, and the wind, what there was of it, rising after beautifully still mornings. Nevertheless, it seems more or less the "off season," as many sheds are closed. Certainly it *is* chilly, to put it mildly, sitting behind a propeller with about ten degrees of frost, but there are quite a number of enthusiasts who cheerfully brave the cold.

On Tuesday of last week the Bristol machine was out at 8 a.m., and Mr. Low did several straight flights with Capt. Wood behind as passenger, and afterwards several straight runs with Capt. Wood in the pilot's seat. Capt. Wood then took the machine out, doing some excellent straight flights, finishing up with very steady landings. Mr. Low afterwards took out the Bristol-Gnome for demonstration and did several good circuits.

On Wednesday, the 16th, Mr. Gilmour was the only airman out. Late in the afternoon he was "daisy cutting" on the Martin-Handasyde monoplane, now repaired, to tune up the J.A.P. engine.

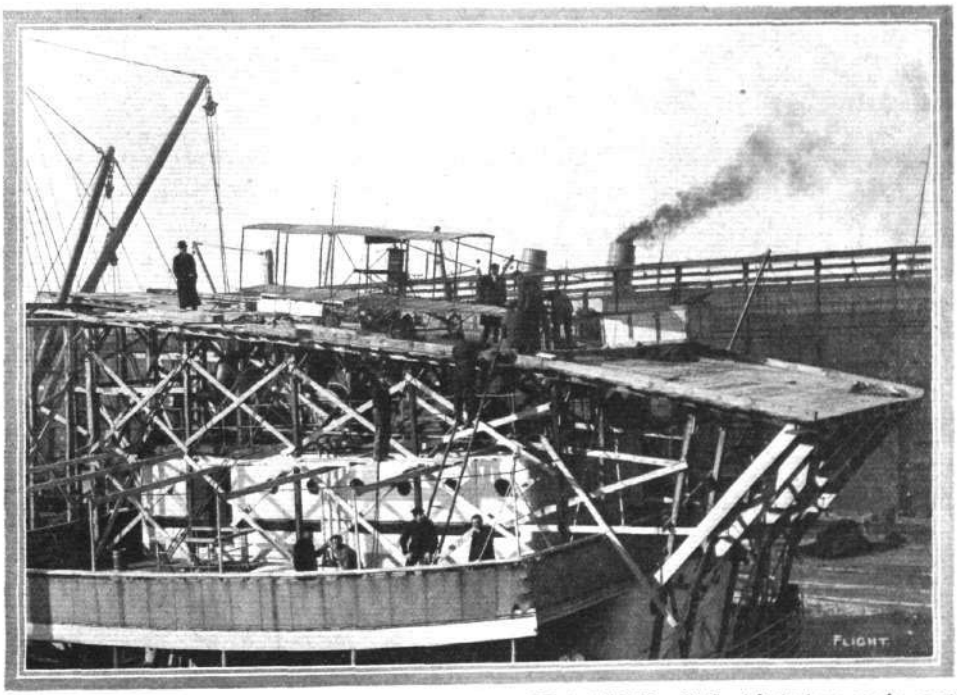
Thursday afternoon saw the Avroplane, with Mr. Pixton piloting, making circuits of the ground at an altitude of about 60 ft., flying very well. Mr. Oxley was making hops, also on the Avroplane.

Mr. Watkins, on his Howard Wright biplane, and Mr. Greswell, on the Grahame-White School machine, were in good flying form, 100 feet up. The little monoplane, "Neale VI," now fitted with a 20-h.p. J.A.P., was out for the first time, with Mr. Fisher and Mr. Raynham tuning up the engine and trying the controls.

Mr. Gilmour indulged in straight flights on the Martin-Handasyde, which he now has under control.

The Bristol was again out in the charge of Mr. Low, the school instructor, doing several good flights. Later M. Edmond was at work with the Bristol, making some fine circuits of the course.

Friday proved the only undesirable day—windy and muddy—but the aviators made up for lost time on Saturday. Morning and afternoon saw machines in the air, on the ground, and sometimes in the sewage farm. Mr. Pixton was the only one to do any real damage. Coming down on soft ground, the machine turned over, breaking skid and propeller.



LAUNCHING AN AEROPLANE FROM THE DECK OF A LINER.—McCurdy's biplane on the special launching stage prepared on the Hamburg-American liner "Pennsylvania" for the proposed test which had to be postponed, as referred to in FLIGHT.

The Bristol instructional machine having been refitted with the Gregoire engine was taken out by M. Edmond, who did several circular flights in a wind of about 12 to 18 miles per hour. In the afternoon the wind somewhat increased, but Mr. Low was able to take out the Bristol (with Gnome motor) for a couple of circular flights, landing into the wind as much as possible, but the wind increasing closed down the trips.

Mr. Low promises well and is making really good progress. We shall expect to see him going further afield in the near future.

Mr. Jenkins and Mr. Beattie, two of Mr. Roe's latest pupils, were out for the first time, and the Otazell (Collyer-Lang) monoplane, Mr. Lang in the seat, also made its appearance.

On Saturday, a new pupil, Mr. Bendall, arrived at the Bristol School and commenced rolling practice, and later in the day achieved some straight flights.

No fewer than eight machines turned out on Sunday afternoon. Messrs. Beattie, Jenkins and Pixton with the Avroplane, Mr. Gilmour with first the Martin-Handasyde and then his "Big Bat," Captain Wood on the Bristol-Gregoire, Lang and Macfie completing the number. Mr. Gilmour took up Mr. Handasyde on his Gnome-Blériot, and felt the wind at an altitude of 100 ft., although near Mother Earth the flags hung close to their poles. This has often been observed at Brooklands, lying as it does in a hollow, sheltered in some parts by trees.

Mr. Macfie's trial was the most interesting event of the week to the British aviators, he having fitted the new Empress engine, the first one to take the field, and we hope very shortly the air. Every assistance and encouragement possible should be given to this British rotary engine, and we hope it will come up to the maker's expectations. The trial showed that more tuning up will be required, but we shall hope to give a good account of it next week.

Mr. Sopwith provided some excitement on Monday, the 21st. He brought out his new Howard Wright biplane for the first time. He did rolling practice in the morning, straight flights before luncheon, circuits in the afternoon, and qualified for his "ticket" before dark. Most aviators would then have rested on their laurels, but Mr. Sopwith went further still, commencing passenger flights, taking up Mr. Manning for an aerial spin. Mr. Snowden Smith, on M. Blondeau's Farman, made a good cross-country flight. Rising to about 200 ft., he left the aerodrome, flying to Byfleet, making a splendid trip of about 20 mins. duration. In the evening, in a good calm, the Bristol-Gnome was out, and Mr. Low did some fine flights in passing the second test for his pilot's certificate. M. Edmond also took Capt. Wood and Mr Bendall for some passenger flights, at times rising to about 300 ft. Mr. Pixton, on the Avroplane, found difficulty in keeping aloft, owing to unsuitable propellers.

The "Neale VI" was also out, testing propellers.

Mr. Billings has purchased Mr. Moreing's Voisin (the first machine piloted by Captain Maitland), long hidden away in Shed 2. He brought it out for a trial run, and it showed its appreciation of regaining its liberty by charging straight for the sheds, but a crowd managed to hang on to different parts of the machine, checking its career with one plane just touching the shed. The cause was the failure of the switch to stop the engine.

On Tuesday afternoon Mr. Smith made the three flights necessary for his certificate on the Bristol-Gnome, flying at an altitude of 100 ft. Mr. Low completed his qualifying flights.

Mr. Sopwith was out flying at a good height on his biplane. Mr. Hubert on the Grahame-White Farman, flying in a heavy mist in the late afternoon, landed in the sewage farm, breaking the under chassis.

Freshfield Aerodrome near Liverpool.

A GOOD deal of activity has taken place at this little aerodrome lately, where there are now five sheds, each occupied by an aeroplane. In Shed No. 1 is a biplane own by Planes, Ltd., with which considerable success has been attained by Mr. Fenwick. He has accomplished several short flights, and on Saturday last flew to Southport and back in 24 mins. From experiments made by Mr. Fenwick, this machine appears to be remarkably stable. In the second shed is housed Mr. Paterson's Curtiss machine, which will soon be superseded by an improved biplane fitted with a 50-h.p. Gnome engine. Mr. Melly's Blériot machine occupies the third shed, while a similar machine, belonging to Mr. Higginbottom, is in No. 4. The fifth shed has only just received its occupant, in the shape of a new Henry Farman machine, and in view of the wide experience of the owner a good deal should be heard concerning this in the near future. On Monday Mr. Melly flew over to Southport, and a little later his example was followed by Mr. Fenwick. Both flew back to Freshfield after a few minutes rest.

The London Aerodrome.

DURING the morning of Tuesday last week the Blériot school had two pupils, Mr. Bouwens and Capt. Board, out for some 20 mins. each, when rolling practice was indulged in. The way the pupil with each lesson attains further proficiency is most marked. "Valkyrie III" (small type) was out, and made a number of successful flights, in one of which the pilot flew rather more than three complete circles of the aerodrome. In the afternoon it was both windy and wet, and no one was out.

Next day the weather proved altogether too rough for flying.

On Thursday, in the afternoon, "Valkyrie III" was again out, and made three good flights, each of about two and a-half circles of the aerodrome. At dusk "Valkyrie II" (the three-seater passenger carrier) was taken out for the first time. At the first attempt it lifted easily and flew about half a mile; it then made a full circuit of the aerodrome, when descent had to be made owing to the darkness. The machine behaved very well, rose quickly, and flew with very little power. M. Prier took out the Blériot-cum-Gnome, and made a fine flight over the aerodrome and surrounding country, attaining a height of 1,200 ft., from which he came to earth by means of a singularly daring *vol plané*, in which he turned several times with great dexterity. The pupils, Mr. Bouwens and Capt. Board, were both out in the morning, the former being only out for a short time, while the latter was out rather longer. The termination was rather sudden, as when flying he came rather too near the sheds and had to alight too sharply, with the result he broke his propeller.

Friday and Saturday were blank days again, owing to the unpropitious weather.

The weather on Sunday was not quite perfect, a slight wind disturbing an otherwise ideal afternoon. The "Valkyrie" three-seater made several fine flights, totalling to nine circuits, including one of about four complete circuits of the aerodrome, in addition to several straight flights for the benefit of a photographer.

The pilot had intended to put up a longer flight, but was not sufficiently clothed to stand the intense cold.

On Monday a good deal of work was done. After a somewhat breezy morning the afternoon proved bright and calm, although it was always very cold. Capt. Board came out first, and showed marked improvement on his last lesson; in fact, he left the ground and flew for a short distance at a height of about 15 ft. In the course of the lesson he got very close to the sheds, and it was only by means of a dexterous turn that he got down safely. Mr. Bouwens then went out for a short time and made four creditable flights, in which he showed marked ability in turning. The monoplane belonging to Mr. Everett was also out, with Mr. E. Clutterbuck as pilot for a time, and later with Mr. Everett. The machine indulged in rolling practice.

The event of the afternoon, however, was the flying of the Aeronautical Syndicate's "Valkyrie II" (the large three-seater passenger-carrying type). After a short trial trip, the pilot took up three passengers—Mr. Clutton, secretary of the London Aerodrome, Mr. Laborde, assistant secretary of the Aeronautical Syndicate, Ltd., and Capt. Board—one after the other.

Each passenger was carried about a circuit of the ground, and a few short runs, at an average height of 50 ft. from the ground. The machine was wonderfully steady, and the unanimous opinion of the passengers was that she was exceedingly comfortable, and well adapted for observation purposes.

Altogether a creditable record of work for the week. The Aeronautical Syndicate are to be warmly congratulated on the great success attained by their three-seater. This large Valkyrie has proved not only that she can fly but that she has all the stability of the small machines.

Salisbury Plain.

THE week has been one of severe cold, but on Monday the Bristol biplane was out at midday in charge of M. Tétard. He first of all took up Mr. Herbert Thomas as a passenger and flew for some distance, when the E.N.V. engine commenced to missfire, and the machine came down with a rush from about 200 ft.; but in spite of this a safe landing was made. After the engine had been tuned up, M. Tétard took the Bristol out again. He mounted very steadily and was soon away out of sight, after a while coming into view again on the far side of the school hangar. He then continued his flight over the village of Amesbury, ending with a magnificent *vol plané*, commencing just over the sheds from a height of about 1,000 ft., the distance of the cross-country flight totalling about 18 miles. It was freezing hard at this time, but after he had warmed his numbed limbs, he again took the machine out with Mr. Herbert Thomas, one of the pupils, as a passenger. The machine rapidly rose to a height of about 500 ft., and during this flight the pupil took the lever under the instructor's guidance. After a flight of about 25 minutes duration, the flight finished with the usual gliding flight. Several of the "Bristol" School pupils will during the coming week be finishing their course of instruction, having progressed very rapidly.

The Royal Aero Club of the United Kingdom

OFFICIAL NOTICES TO MEMBERS

Committee Meeting.

A MEETING of the Committee was held on Tuesday, the 22nd inst., when there were present:—Mr. R. W. Wallace, K.C. (in the Chair), Mr. Griffith Brewer, Mr. Ernest C. Bucknall, Mr. Cecil S. Grace, Prof. A. K. Huntington, Mr. V. Ker-Seymer, Mr. F. K. McClean, Mr. J. T. C. Moore-Brabazon, Mr. C. F. Pollock, Mr. Stanley Spooner, and Harold E. Perrin, Secretary.

New Members.—The following new members were elected:—

Charles A. P. Hawkins.	Maurice Tetard.
Henry M. Jullerot.	Herbert J. Thomas.
Bertram Ogilvie.	Francis Farnell Thurstan.

Aviators' Certificates.—The following Aviators' Certificates were granted:—

30. H. Barber.	33. Archibald R. Low.
31. T. Sopwith.	34. Sydney E. Smith.
32. J. J. Hammond.	

Aeronaut's Certificate.—Capt. E. M. Maitland made his Solo Ascent on Wednesday, the 16th inst., in the "Pompadour," qualifying for an Aeronaut's Certificate. Capt. Maitland, having complied with all the rules, was awarded an Aeronaut's Certificate.

Official Representatives in South Africa. — Mr. Roger Wallace, who has recently returned from South Africa, reported his interview with the Automobile Club of South Africa. It was unanimously resolved that the Automobile Club of South Africa be appointed the official representative in South Africa of the Royal Aero Club.

Gordon-Bennett Aviation Cup.—The following letter from Mr. Cortlandt F. Bishop was read:—

"Aero Club of America,
"29, West 39th Street, New York,
"November 14th, 1910.

"Roger Wallace, Esq., K.C.,
"President, Royal Aero Club of the United Kingdom.

"My dear Mr. Wallace,—

"To-day is my last one as President of the Aero Club of America. I had the honour to ship to you on Saturday last the International Aviation Trophy, which was won by Mr. C. Grahame-White, as representative of your Club. It is on the steamship 'Cedric,' of the White Star Line, and should arrive in England soon after this letter does.

"With the kindest regards and with hearty congratulations on the victory of the Royal Aero Club of the United Kingdom.

"I remain, yours very truly,
(Signed) "CORTLANDT F. BISHOP, President."

Baron de Forest £4,000 Prize.

Entries.—Intending competitors are reminded that it is necessary to give one month's formal notice of entry, and that the competition closes on December 31st, 1910.

Particulars of Aeroplane.—Competitors who have not already sent in full particulars of their aeroplanes, are requested to do so forthwith. In view of the large number of entries, and the necessity of inspecting each machine before an attempt is made, competitors are asked to give early notice as to when and where such inspection can take place.

French Customs.—Negotiations are now in progress with the French Customs through the Aero Club de France for the free entry of the aeroplanes into France. This privilege will, if granted, only hold good for a period of one month, and will only be applicable for this particular prize.

Official Observers.—The Committee of the Royal Aero Club will be glad to hear from members who can assist in observing the starts from the English coast. At present it appears that Dover and Folkestone will be the most likely starting places.

British Empire Michelin Cup.
(Prize £500 in cash, with Replica of Trophy.)

Intending competitors are reminded that the competition for this year closes on December 31st next. Full particulars can be obtained from the Royal Aero Club.

Rolls Memorial Fund.

Members who have not yet sent in their contributions to the above Fund are requested to do so as early as possible. By limiting individual subscriptions to the sum of 10*s.* the Committee hope they will receive the support of all members.

Contributions of books to the **"Rolls Memorial Library"** will also be greatly appreciated.

A list of subscriptions received to the 16th inst. was published in the last issue, and the following have since contributed up to November 23rd, 1910:—C. L. R. Aspinall, Lieut. John B. Bolitho. *Per Aero Club de France*:—Jacques Balsan, René Gasnier, Comte Hadelin d'Oultremont.

Hendon Aviation Ground.

The proprietors of the aviation ground newly laid out at Hendon have kindly arranged that members of the Royal Aero Club shall have free admission, on production of their membership cards. This ground is situated in Collindale Avenue, a turning out of the main Edgware Road, just beyond Hendon. Its distance from the Marble Arch is about 6½ miles. Subject to weather conditions, flights take place daily.

Flights Over Towns.

It was decided to issue the following notice to all aviators, aviation schools and flying grounds:—

"*The Royal Aero Club of the United Kingdom.*

"Flights Over Towns.

"The practice of flying unnecessarily over towns or thickly-populated areas is considered to be not only fraught with considerable risk to the public, but also useless in furthering the progress of aviation.

"The Royal Aero Club has formed a Special Committee to deal with such cases as may come to its notice, and to inflict such penalties as it may think necessary upon any of its members as certified aviators who may make such undesirable flights. In the case of similar flights by persons not holding a certificate, the subsequent granting of a certificate may be jeopardised."

HAROLD E. PERRIN,
166, Piccadilly. Secretary.

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PROGRESS OF FLIGHT ABOUT THE COUNTRY.

NOTE.—Addresses, temporary or permanent, follow in each case the names of the clubs, where communications of our readers can be addressed direct to the Secretary. We would ask Club Secretaries in future to see that the notes regarding their Clubs reach the Editor of FLIGHT, 44, St. Martin's Lane, London, W.C., by first post Tuesday at latest.

Aeroplane Building and Flying Soc. (8, MANCHESTER ST., W.).

THE gliding hill has supplied enterprising members with a new sensation, a flight down the cables on the trolley being a very exhilarating experience; almost as good as flying, and very good practice for budding aviators. The alterations to the stopping device have proved satisfactory, and although several small breakages have occurred they have all been put right and everything is now ready for action. Unfortunately the members have not been able to cover the glider yet, as work in the open air has been impossible. An emergency meeting was therefore called on Wednesday, and it was decided to build a proper shed capable of not only housing both the glider and monoplane but of being used as a workshop as well. All the plans were prepared at once, and the timber, sashes, doors, &c., purchased, so that an immediate start could be made. With a proper workshop on the ground things should move more rapidly.

A Model Aero Club at Salisbury.

IN connection with the Y.M.C.A. at Salisbury, a model aero club has just been formed. The entrance fees and subscriptions are moderate, and prospective members should apply to W. Street, hon. sec., Y.M.C.A., Winchester Street, Salisbury, for fuller particulars.

Arundel House School Ae.C. (15, ARLINGTON ROAD, SURBITON).

ON Saturday, November 19th, the members of the senior branch held their third annual "Invention" competition on Ham

Common, Kingston-on-Thames. This event is rather a novelty, prizes being awarded for the best "invention" or improvement of the year in matters relating to aviation. Competitors send in a written description and a working model, and half the points are awarded for the theory of the improvement, and the other half for the results in actual practice. Mr. Wilfrid L. Evershed again undertook the somewhat arduous duties of judging in this difficult competition, and awarded the first prize—a book, value 7*s.* 6*d.*—to C. K. Scarf for his new type of landing chassis for an aeroplane, and the second—a mechanical model winder—to Crawford Griffiths, who submitted an ingenious combination of buffer, skid, outrigger, and rudder. These competitors, out of a maximum of 20, secured 19 and 17 points respectively. The other entries included an improved method of attaching the back surface of a model to a triangular frame, a method of bomb dropping from an aeroplane, and a new type of model glider.

After the competition a display of model aeroplane flying was given by members. The finest performance of the day was achieved by Crawford Griffiths, who obtained a splendid flight of 40 secs. duration with a Ridleyplane, closely followed by R. F. Mason with one of 36 secs. The Mann monoplane was placed all but *hors de combat* in one of its preliminary trials by a disastrous collision with a tree, and its behaviour under such adverse circumstances does credit to the energy and perseverance of the designer.

East London College Ae. Research Soc. (MILE END ROAD, E.).

THE next lecture will be held on December 5th, the subject being "The Cody Machine," and the lecturer Mr. A. P. Thurston. On the following Thursday Mr. J. Cousins will lecture on "Aerial Guns," while on December 12th Mr. A. P. Thurston will lecture on "Maxim's Recent Work on Aeronautics," and on December 15th Mr. A. G. Field will repeat his lecture on "Aerial Photography." A number of lectures are also being arranged for next year, while it is proposed to hold a model competition about Easter time and an Aeronautical Camp some time during next summer.

Manchester Ae.C. (Model Section) (52, MANSFIELD CHAMBERS).

THE members of the above society held an exhibition of models in the workshop on November 19th, there being a large attendance of members, and the number of models shown greater than expected.

Many visitors who were present displayed keen interest in the models shown, with the result that several new members were enrolled.

The medal for the best original idea of a model flying machine was won by Mr. W. M. James, who has invented several novel model aeroplanes. Mr. Norton won the medal for the best scale model with a very accurate model of the "Valkyrie," while the prize for the best home-made propeller was taken by Mr. Carter, and the prize for the best home-made geared motor by Mr. Vertun. A special certificate was given to Mr. C. H. Taylor for a model propeller testing apparatus.

A gliding competition which was held proved very instructive, Mr. Kenworthy securing the prize with a neat-little glider.

Westcliff and Southend Aero Club.

A BRANCH of the Paddington Aero Club has just been formed at Westcliff with Mr. D. Walker, of the Haven, Brightwell Avenue, Westcliff, as the honorary secretary. One member has a full-sized machine, with which it is hoped trials will be conducted very shortly now, and the club is endeavouring to arrange for something in the way of a flying week to be held at Southend during next summer.

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SOME WELL-MADE MODEL PROPELLERS.

THE accompanying sketches illustrate some of the latest model propellers that Messrs. J. Bonn and Co. have built. They are, as usual, excellent examples of high-class model work. The largest shown in the sketch has a diameter of 14¼ ins., and is a laminated propeller made of sequire and white wood. The next largest is cut from solid sequire, and the smallest propellers are made from satin

walnut. In some cases the finish is obtained by the use of enamel, and in others solely by polishing the wood direct.

Sequire is an American wood that is rather difficult to procure owing to the small demand for it. It is comparatively light in weight, being only about two-thirds as heavy as satin walnut, but, unfortunately, it is not nearly so strong as the latter wood.

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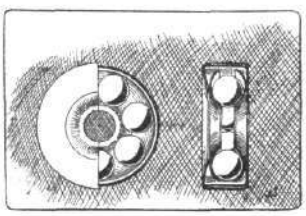
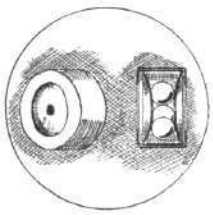
BALL THRUSTS FOR MODELS.

Two miniature ball thrust bearings that should be of interest to model makers are illustrated herewith. One of them, which is constructed by the Gearless Spring Motor Co., only measures ¼ in. in diameter and weighs barely $\frac{1}{160}$ of an ounce. The ball races are made of pen steel, and its seven Hoffmann balls are each $\frac{1}{16}$ in. in diameter. The other ball thrust, made by Hill and Co., measures



The Gearless Spring Motor Co.'s miniature ball thrust.



A miniature ball thrust by Hill and Co.

about ½ in. in diameter and about ¼ in. between the faces. It weighs about $\frac{1}{10}$ oz., and contains five balls running between two dished steel plates. A bead mounted on the shaft on one side of the thrust makes a suitable washer to keep the propeller clear of the outer casing.

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BALLAD.

(From any Aviator to any Aeroplane.)

No maiden ears have heard my vows
Of changeless love and fealty,
And yet mine is the fairest spouse
Man ever had on land or sea.
I wooed her in the summer sun,
I wooed her in the winter rain,
And now I know at last I've won
My matchless Lady Aeroplane.

Her planes are snowy white in hue,
And her propeller's perfect quite,
Angle and balance both are true,
Her engine is a pure delight.
Forgotten now are all the years
I wooed and strove for her in vain,
And vanished too my doubts and fears—
She's mine—my Lady Aeroplane.

Though other men perchance may claim,
That they have found a bride as fair,
'Tis you who brought me joy and fame,
And none can rival you I swear.
So flying gaily on we two
Laugh at the others with disdain,
There's nothing that we cannot do,
I and my Lady Aeroplane.

Envoi.

(After the smash.)

Women are fickle so they say,
And wooing them is scarce a gain,
But you are fickler far than they,
Inconstant Lady Aeroplane.

DOROTHY M. HAWARD.

BRITISH NOTES OF THE WEEK.

Another British Military Pilot.

INCLUDED among the pilot-aviators' certificates granted last week by the Royal Aero Club of the United Kingdom was one to Capt. J. B. Fulton, R.A., the first aviator to obtain this certificate on the Salisbury flying ground. For some time Capt. Fulton has been practising with a Blériot monoplane, and advised the Royal Aero Club that on last Saturday week he intended to try for his pilot's certificate. Unfortunately, when the official observers arrived the Blériot monoplane was temporarily *hors de combat*, but Capt. Fulton borrowed Mr. Cockburn's Farman biplane, and succeeded in making the necessary qualifying flights.

A Lecture at Manchester.

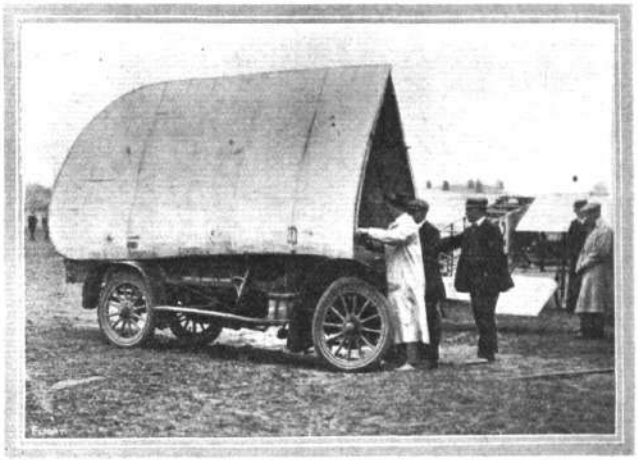
ON the 18th inst. Mr. Joseph Clarkson gave a lecture under the auspices of the Manchester Education Committee at the Municipal School of Technology. His subject was "Vertical Flight and Reduced Horse-Power," and the lecturer described a new aerial propeller of the paddle-wheel type which he has invented. A model of this apparatus, 8 ft. in diameter, was shown, and a number of experiments carried out which greatly interested the audience.

Dover–Ostend Flight for Next Year.

ALTHOUGH the aviators intent on cross-Channel honours have, up to the present, favoured a route between England and France, it is likely that next year will see a change if the idea at present being considered by the Royal Ostend Yacht Club and the Ostend Aero Club comes to anything. In connection with the annual cross-Channel race of the former club it is proposed to organise a flying race from Dover to Ostend and back, a distance of about 60 nautical miles each way. The aeroplanes would start after the yachts, and it is thought that the latter would thus be able to render any assistance to the aviators, should it be necessary, while the Committee Boat—one of the Dover-Ostend Mail steamers—would also be able to render any help necessary.

To Secure Colonial Trade.

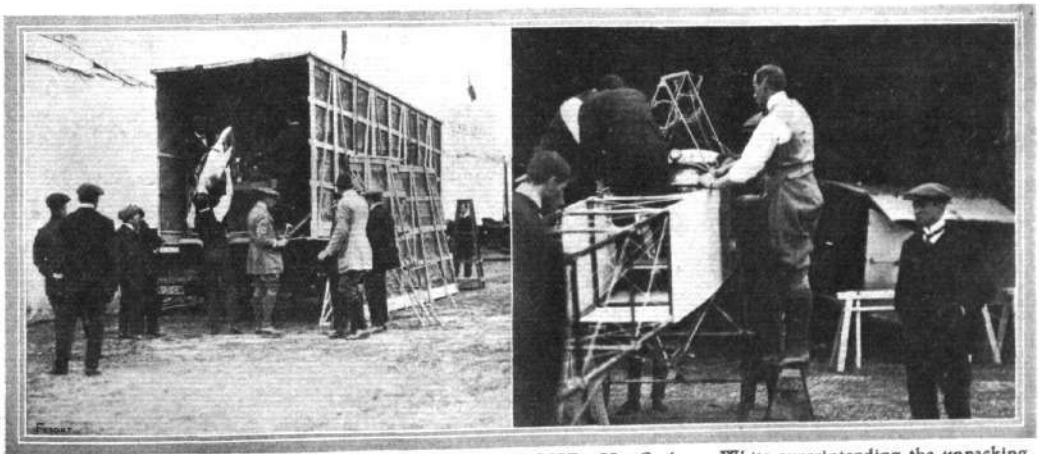
EVIDENTLY the British and Colonial Aeroplane Co. is determined to live up to its title, and with a view to securing the Colonial aeroplane trade for the old country the firm have arranged for special missions to visit India, Australia, and New Zealand. The "team" which will go to Australia and New Zealand will consist of Mr. Sydney E. Smith (the Company's manager), Mr. Joseph Hammond, Mr. L. Macdonald, and a staff of mechanics; while the Indian contingent will consist of Mr. Farnell Thurstan, M. Henri Jullerot, and a staff of mechanics, one of whom is a capable flyer. Both these parties will make extended tours, exhibiting Bristol aeroplanes and giving demonstrations *en route*, and it is anticipated that many orders will be forthcoming as a result of this farsighted enterprise on the part of the Company.



How Mr. Barnes packs up the wings of his Humber monoplane on a Humber car for transporting from place to place—a reminiscence of Bournemouth.

Humbers, Ltd., and Aeronautics.

IN the report of the directors for the nineteen months ending August 31st last, just issued, they state that the development of aeronautics has received their close attention. Successful aeroplanes and engines have been produced at the Company's works, with which prizes have been won, and aerial engines have been supplied to various foreign countries. A contract has been signed with the committee of the United Provinces Exhibition, India, under which two of the Company's aviators have this month proceeded to that country with aeroplanes, in consideration of the payment to the Company of a sum of money, to include expenses, and of the concession of certain rights and privileges, which, it is stated, should prove of considerable benefit to the Company. The directors are engaging in aerial productions with caution, and, should a large development result, it may be expedient to form a separate Company in order to provide independent working capital. Proposals received in this connection are now under consideration.



HOW AN AEROPLANE ARRIVES AT AN AERODROME.—Mr. Grahame-White superintending the unpacking of his monoplane; and, on the right, assisting in its erection.

FOREIGN AVIATION NEWS.

Prince Henry Qualifies as a Pilot.

DURING last week Prince Henry was continuing his practice on the Euler biplane, and on the 16th flew 4 kilos. at a height of 15 metres. On Saturday last, on the military parade ground at Darmstadt, he successfully qualified for the pilot's certificate of the German Aeronautic Association, the official observers being Herr von Hiddessen, Herr von Hammacher, and Herr Auguste Euler.

After the World's Duration Records.

THE world's records set up by Tabuteau recently are to be assailed shortly both in France and in Switzerland. In France Mr. Henry Farman will try to place the record once more to his own name, and for that purpose will shortly take up his quarters at Etampes in order to practise with a new fast biplane on which he proposes to try incidentally to repeat his success of last year and win the Coupe Michelin. In Switzerland, M. Dufaux proposes to try for the record, and will have a novel course inasmuch as his flight will be made over the Lake of Geneva.

A Youthful Blériot Pilot.

A GOOD second to Marcel Hanriot for the honour of being the youngest aviator is Pierre Beard, who has recently successfully qualified for the pilot-aviator's certificate of the Aero Club of France at the Blériot school at Etampes. He was born on April 2nd, 1893, and is thus a little over a year older than Hanriot, who was born on June 8th, 1894.

"Tour de France" by Aeroplane.

FOLLOWING on the success which has attended the Cyclists' "Tour de France" for the prize offered by the City Council of Paris, M. Quentin Bauchart has suggested that the competition for the Grand Prix d'Aviation offered by the Council should take a similar form, and he proposes that the start and finish should be at Issy, and that the other points on the route should be Bordeaux, Toulouse, Marseilles, and Lyon. The idea has been extensively taken up, and there is every prospect of France having a similar competition to that which it is proposed to organise in England next year for the *Daily Mail* prize.

At the Tellier School, Etampes.

AFTER a lengthy absence, Mr. D. Lawrence Santoni has returned to the Tellier School at Etampes and on Saturday succeeded in making his first turnings during the course of a fine flight over Etampes and the surrounding country at a height of about 500 ft. He was using one of the new Tellier machines fitted with a 6-cylinder Panhard motor and at the end of the flight landed by a splendid *vol plané* in front of the sheds. Last week M. Chateau took M. Le Maire (who weighs 85 kilogs.) as a passenger on a two-seated Tellier monoplane fitted with a 5-cylinder 60-h.p. R.E.P. engine. They left the school ground at Etampes at half-past nine, and reached Rambouillet—38 kiloms. away—28 mins. later, a remarkable performance, considering that the load on board was about 200 kilogs. Just before the departure of the Blériot School for Pau, the Prince de Nissole mounted his Tellier monoplane and flew over to the Blériot School at Etampes to say goodbye to some of his friends there.

A Blériot Over Paris.

LEAVING the Issy parade ground at half-past three on Monday afternoon, Mollien, on his Blériot monoplane, passed across the Seine, over the Trocadero, and along the Avenue Victor Hugo, where he circled round the Arc de Triomphe and then made his way back to his point of starting. A thick mist hung over the city at the time, but in spite of this the aviator made the trip in about 30 mins., while his altitude averaged about 250 metres.

Doings at Buc.

ON Monday two aviators, who proposed to have a try for the A.C.F. Grand Prix from Paris to Brussels and back, were practising at Buc. Tabuteau was using his new Maurice Farman with which he was making several very sharp turnings, while Loridan was trying his Henry Farman machine. Maurice Farman himself was instructing the four new military pupils mentioned in FLIGHT last week. At the R.E.P. school both Laurens and Pierre Marie were flying over the country around the aerodrome. The latter aviator was in the air for three quarters of an hour, during most of which time he was flying at a height of 800 metres, and he landed by gliding down from this height.

Mdlle. Dutrieu Qualifies for Her Certificate.

ON Tuesday last, at Etampes, before two official observers of the Aero Club of France, Mdlle. Helene Dutrieu succeeded, on her Henry Farman machine, in making the qualifying flights for her pilot aviator's certificate. A new machine has been specially built for the lady flyer by Mr. Henry Farman, and on this she hopes shortly to make a trip from Etampes to Orleans.

Pierre Marie Visits the Tellier School.

RISING on Monday from the Buc Aerodrome on his R.E.P. monoplane, Pierre Marie flew off with the intention of paying a visit to some of his friends who are learning to fly at the Tellier School at Etampes. He traversed the distance in 50 minutes, his speed being about 95 kiloms. an hour. He intended to fly back to Buc later in the day, but the fog rendered it necessary to postpone the start until Wednesday.

From Vincennes to Etampes.

A GOOD journey was carried out by Naval Lieut. Delage on Tuesday, when, rising from the Military Ground at Vincennes, he started off to fly to Etampes. One stop was made *en route*, at Juvisy, from where the officer started off again almost immediately, and reached his destination without mishap. Lieut. Delage proposes to make an attempt shortly to win the Lazare Weiller prize of £1,000 for despatch-carrying by officers in uniform.

Mr. G. W. Hamel, a graduate of Cambridge, who has been making a series of very successful flights at a great altitude on his Blériot monoplane at Nagyvarad (Hungary). He was particularly successful at the Budapest Meeting.

New World's Records Recognised.

IN connection with the world's records set up by Tabuteau the other day four official records have just been passed by the Aero Club of France They are as follows: Duration record 6 hrs., distance record 465·72 kiloms., speed records 400 kiloms. in 5h. 13m. 8s., 450 kiloms. in 5h. 49m. 38s. Time and distance record, time 6 hrs., distance 464·7 kiloms.

Paris to Pau Prize.

THE conditions have now been issued by the Aero Club of Bearne under which their trophy, valued at 20,000 francs, originally offered for a flight across the Pyrenees, will now be competed for. It will be awarded to the aviator who during the first six months of next year first makes the journey between Paris and Pau within a maximum time of three days. Competitors may land at any point for replenishing, but they must have their record sheet signed by those who witnessed the landing. The start will be from the Issy ground and the finish may be at either of the three aerodromes at Pau, but before starting the aviator must state at which aerodrome he wishes to alight.

A.C.F. Grand Prix.

WITH the closing date of entry for the Grand Prix of the Automobile Club of France drawing near, the number of entrants is gradually increasing. They now number nine, the two latest being Maurice Tabuteau, who proposes to use a new biplane built for the purpose by Mr. Maurice Farman, and Count Lambert, who will use one of his favourite Wright biplanes.

Aviator Returns His Prizes.

AN unusual course has been taken by the Belgian amateur aviator Frenay, who has presented to the Société Liégeoise for the Study of the Construction of Flying Machines the amount of prize money he won at the recent Kiewit Meeting. The money will be spent in the purchase of various scientific instruments with which it is intended to carry out an extensive series of experiments to measure the force of the wind over the different surfaces of aeroplanes, &c. The experiments will be carried out on the machines belonging to M. Frenay and M. Chauvin. The accounts of the meeting recently held at Kiewit by the Liege-Spa Aero Club show that it was carried out without loss.

From Belgium to Holland by Aeroplane.

ON the 15th inst., Verschaeve made a fine flight on his biplane from the Kiewit aerodrome in Belgium to Vulkenswaard in Holland, covering the distance of 47 kiloms in 35 mins., being favoured by a strong breeze from the south. The aviator anchored his machine in the open for the night, but unfortunately a storm arose and damaged the machine so much that it had to be taken back to Kiewit by road.

A New Aerodrome in Belgium.

ALTHOUGH there are several flying grounds already in use in Belgium a new one is being prepared in the neighbourhood of Brussels. It is situated between the stations of Berchem and Grand Brigard, and is about 5 kiloms. from the Belgian capital. The ground is to be levelled and planted with short grass and clover, and it is hoped that it will be ready for use by about the middle of February next. The new ground will have an area of about 90 hectares and it is anticipated that several of the prominent French manufacturers will establish schools there.

A Belgian Military Farman.

A SHED has just been erected by Belgian Military Engineers at Kiewit for the first military aeroplane bought by the Belgian Government. The machine is of the Farman type, and will be piloted by Lieut. Nelis, who has received his instruction from the Chevalier de Laminne.

A German National Meeting.

A MOVEMENT is on foot in Berlin with a view to organising a big competitive event for aeroplanes in Germany next year, over the following course:—Berlin, Hamburg, Hanover, and Berlin. This will be confined to German-built aeroplanes fitted with German motors, and it is hoped that the Government will actively assist the competition, both by nominating representatives on the organising committee and also by a substantial subvention.

Flying Instructor for German Army.

THE German military authorities are evidently determined not to be behindhand with regard to aeroplanes now, and the latest announcement is that the successful aviator, Simon Brunnhuber, has been engaged by the Prussian Minister of War as military flying instructor. He will take up his duties on January 1st next. Ten officers are now in training at the military aviation ground at Doebritz, where they are being taught to manipulate various types of machine, while at Bork two captains and five lieutenants are being taught to fly with the Grade monoplane.

Flying in the Caucasus.

THERE will soon be few spots in the civilised world where the aeroplane has not been seen. On the 17th inst. Vasilier was flying at Tiflis on his Blériot machine at a height of 1,000 metres for a period of about half an hour. He made several circles over various objects of interest in the neighbourhood. In a subsequent flight he was not able to stay up for long owing to mist obscuring his landmarks.

Italian Big Events for Next Year.

ALREADY three dates have been fixed for three big flying events which it is proposed to hold in Italy next year. They will all take place in June, the first being the meeting at Rome from the 6th to the 11th, the 12th to 18th will be taken up with a cross-country event from Rome to Turin, while from the 19th to 26th a flying meeting will he held at Turin.

Italian Passenger Record.

ON Saturday afternoon, in the neighbourhood of Turin, Eros succeeded in beating the Italian passenger record with a flight of 80 kiloms., accompanied by a friend.

The Dufaux Brothers Honoured.

AT the meeting of the Swiss Federal Council held at Berne, Mons. Robert Comtesse, President of the Confederation, received the two brothers Henri and Armand Dufaux, and the two aviators Faddeoli and Failloubaz, and in the name of the Federal Council he presented each, by way of recognition of their work in the cause of aviation, with a gold watch bearing an inscription as follows: "Le Conseil Fédéral au Premiers Aviateurs Suisses, Octobre 1910."

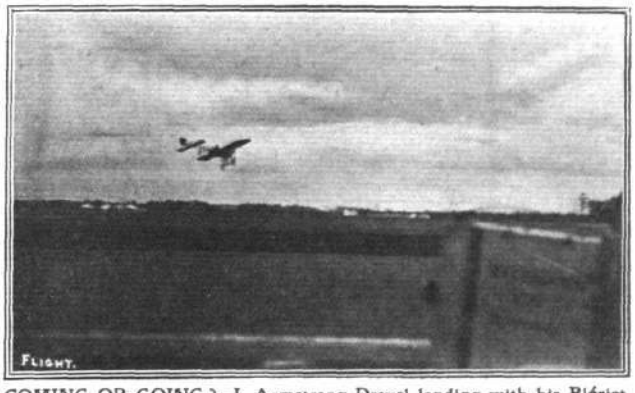
The Fatal Accident to Johnstone.

ANOTHER victim to the unnecessary "circus" exhibitions which have been so frequently condemned by flying experts is Ralph Johnstone, the holder of the world's altitude record. He was giving a series of exhibition flights on his Wright machine at Denver, Colorado, on Thursday of last week, and was descending by a series of sensational dives, when the machine collapsed and fell to the ground, the aviator being killed instantly. It is to be regretted that Johnstone could not restrain his inclination to indulge in his dangerous tricks, as there is little doubt that if he had been content with reasonable flying the accident would never have occurred. His friends had often predicted that he would meet his death in this way, and he himself seems to have been prepared for such an end. On Friday last several of the leading American papers advocated that such "circus" feats should be eliminated from aeroplane exhibitions.

A Flying "Circus."

FROM America the first "Aviation Circus" is reported as having been formed, the programme opening with the following illuminating information: "This circus has enrolled the greatest, grandest, and speediest aggregation of aerial chauffeurs in the world, and in death-defying, dare-devil races through the air they will give the public thrilling value for their money."

It is to be hoped that the "aerial chauffeurs"—said to be Moisant, Charles Hamilton, Roland Garros, Rene Simon, E. Audemars and J. Frisbje—will take a different view of their responsibility to themselves and the public than the compilers of such blatant stuff have in mind. This "circus," which comprises 20 biplanes and monoplanes, and has its own equipment of tents, motor cars, trucks and horses, opens at Richmond, Virginia, to-day (Saturday). After touring the United States, it is intended to exploit Europe.



COMING OR GOING?—J. Armstrong Drexel landing with his Blériot in the Gordon-Bennett Contest at Belmont Park. As a New York reader writes, in sending us this photograph: "You can only tell whether the machine is coming or going by the size of the higher wing."

THE PROBLEM OF THE HELICOPTER.

THE conclusions deduced in the following article, which treats of the theory of static thrust of screws, may be summed up as follows:—

For a given load: the screw of greatest diameter will give the greatest efficiency.
For a given load with a given diameter: the steepest effective blade angle will give the greatest efficiency.
For given revolutions: the blade angle of least resistance will give the greatest efficiency.
By efficiency is meant ratio of thrust to power in the shaft.

THE helicopter, or direct lifting machine, unquestionably has a very great fascination for a large number of people whose ideas on the power required for dynamic support by this means seem to vary so much that it should not be without general interest to investigate the theory of the problem.

There are two broad aspects of the helicopter problem, one associated with ascent, the other with propulsion, but in this article we purpose confining our attention solely to the former. There are also two subdivisions of this aspect, one associated with the mere sustentation of the machine stationary in the air, the other dealing with the actual rise of the machine vertically through the air. Again, we purpose dealing only with the former case.

Air, in common with every other form of matter, derives its capacity for acting as an abutment to a force from its inertia. The inertia of air is exceedingly small, consequently an enormous volume of this fluid has to be used for the support of even small loads. When air is at rest it is incapable of supporting anything of greater density than itself, but when its molecules are in a state of acceleration, resulting from their inertia being overcome by force, air can support solid bodies by reaction. If a volume of air is accelerated downwards the reaction is upwards. This is the basis on which the principle of proposed helicopter flying machines is founded; one or more screws on vertical spindles being employed to *maintain* the downward acceleration of the air that is essential to the sustentation of the load.

When air or any other fluid is maintained in downward acceleration throughout a certain area located in a fixed position in space, a stream of uniform velocity comes into existence below the plane of operation; thus there will be a steady downward draught from a helicopter screw. The measurement of the velocity of this draught, or slip stream as it is technically called, is also a measurement of the acceleration, the dimensions being in feet per second per second. It is assumed, in what follows, that the acceleration is uniform throughout the area, and that the area in question is the disc area of the helicopter screw, as defined by a circle passing through the tips of the blades.

From what has already been said, it may be deduced that when the area is large the velocity of the slip stream requisite to support a given load will be less than when the area is small. Air, in common with all other bodies in motion, possesses energy, and since the energy in the slip stream is obviously wasted, it is eminently desirable that this amount should be as little as possible. Energy in a stream of air varies directly as the area and proportionately to the cube of the velocity, consequently it is essential to keep the velocity as low as possible, which means that the larger the area for a given load the less the power required to sustain it.

Area is proportional to the square of the diameter, hence it is economical to employ few screws of large diameter rather than many screws of small diameter, the total area being the same in both cases. The problem of economically sustaining a load in the air by means of a helicopter thus resolves itself into the use of the largest lifting screw that is practicable.

On the other hand, the circumstances may be such that the problem is to lift the load at any price, in which case the solution is to use the largest permissible engine. Such increase in the size of the engine necessarily sacrifices efficiency in the ratio of thrust to power, but, owing to the fact that the engine represents only a fraction of the total weight, the increase in the total lift is greater, up to a point, than the increase in the total load. The engine cannot be indefinitely increased in size, because sooner or later its proportion of the total load will be such that any increase in the weight of the engine will no longer be adequately compensated for by the increment in the thrust. Thus, for example, if we double the power of an engine we only obtain 1·6 times the thrust from the same screw, or, expressing this in another way, we may say that if the original engine weighs 1·5 times the net load (*i.e.*, total load less weight of engine) then the total lift will increase in greater ratio than the total load until an engine of twice the weight and twice the power of the original engine has been substituted. After this condition has been reached, any further increase in the power of the engine will be accompanied by a greater increment in weight than increment in thrust, consequently the machine will no longer be self-supporting. It is important to remember that the example given above is a particular case, and that the ratios therein do not apply for different conditions, thus, for example, if we quadruple the original engine we shall only obtain 2·5 times the original thrust, and not (2 by 1·6) times.

These are some of the more important mathematical considerations governing the fundamental problem of the helicopter, and likewise, of course, the static thrust of a propeller. Their application may, perhaps, be best seen in the following examples, which, for convenience, are worked out by the aid of the summarised list of formulæ herewith:—

FORMULÆ FOR HELICOPTERS AND THE STATIC THRUST OF SCREWS.

(From "Flight Manual," F 102.)

Symbols:—

T = thrust (lbs.); V = velocity of slip stream (ft./sec.); D = diam. screw (ft.); P = horse-power *in slip stream*; $E = \frac{T}{P}$; w = weight of engine (lbs./h.p.); e = efficiency of screw, and transmission $= \frac{P}{\text{Horse-power}}$.

[It is assumed that V is uniform over the disc area $\cdot 7854D^2$, and that the mass per cub. ft. of air $\frac{\rho}{g} = \frac{1}{420\cdot}$.]

$$T = \frac{D^2 V^2}{535}; \quad V = \frac{\sqrt{535\ T}}{D}; \quad D = \frac{\sqrt{535\ T}}{V}; \quad P = \frac{D^2 V^3}{587{,}000};$$

$$E = \frac{1{,}100}{V}.$$

If P is increased to KP with the same D, then T is increased to $(\sqrt[3]{K})^2 T$.

If T is increased to KT with the same D, then P is increased to $(\sqrt[3]{K})^3 P = K^{1\cdot 5} P$.

Example:—

1. Required a thrust of 1,000 lbs. from a 15-ft. screw. ? P.

$$V = \frac{\sqrt{535 \times 1{,}000}}{15} = \frac{730}{15} = 48\cdot 6 \text{ ft./sec.}$$

$$E = \frac{1{,}100}{48\cdot 6} = 22\cdot 6 \text{ lbs./P.} \quad \therefore\ P = \frac{1{,}000}{22\cdot 6} = 44\cdot 5.$$

2. In the above let $e = \cdot 5$ and $w = 3$; ? net load supported.

$$\text{Horse-power of engine} = \frac{P}{e} = \frac{44\cdot 5}{\cdot 5} = 89.$$

Weight of engine $= 89 \times 3 = 267$ lbs.
Net load $= (1{,}000 - 267) = 733$ lbs.

3. In the above let $e = \cdot 25$ and $w = 5$; ? net load supported.

$$\text{Horse-power of engine} = \frac{44\cdot 5}{\cdot 25} = 178.$$

Weight of engine $= (178 \times 5) = 890$ lbs.
Net load $= (1{,}000 - 890) = 110$ lbs.

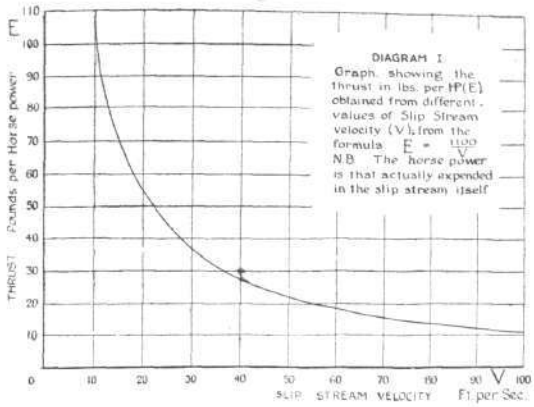
4. A thrust of 400 lbs. is given by a 50-h.p. engine operating a 10-ft. screw. ? *e*.

$$V = \frac{\sqrt{535 \times 400}}{10} = \frac{\sqrt{213{,}000}}{10} = \frac{460}{10} = 46 \text{ ft./sec.}$$

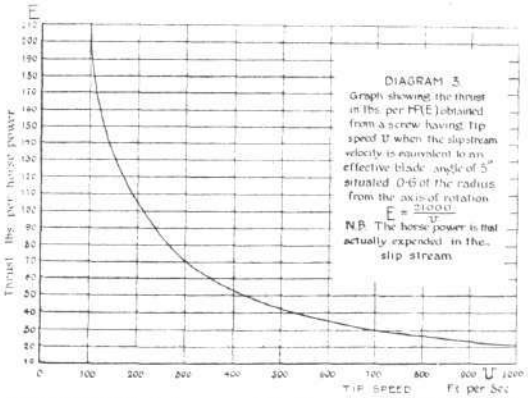
$$E = \frac{1{,}100}{46} = 24 \text{ lbs./P.} \quad \therefore\ P = \frac{400}{24} = 16\cdot 7.$$

$$e = \frac{P}{HP} = \frac{16\cdot 7}{50} = 33\ \%.$$

It will have been observed in connection with the foregoing problems that no mention whatever has been made of the kind of screw to be used, neither as regards its pitch, number of blades, or revolutions. This omission has been made on purpose in order to emphasise a fact that is too often overlooked, namely, that the thrust of a screw is only limited by the cross-sectional area, and the velocity of its slip stream. It has been assumed in the previous examples that the velocity of slip is uniform over an area represented by the disc area of the propeller, which is defined by a circle passing through the tips of the blades. If it is the designer's object to obtain a certain static thrust from a given propeller, as is



at any rate the case with the designer of a helicopter, he will naturally desire that the entire disc area should be effective, and that the velocity should be uniform. Any sacrifice of area is detrimental on grounds that were explained at the beginning of this article, and any variation from uniformity of velocity likewise results in



inefficiency, because those currents in the main stream that flow at a more rapid rate than others waste power proportionately to V^3 while they only add to the thrust in proportion to V^2. The net result must, therefore, be a loss. Whichever way the process is regarded, however, the fact remains that the practical values obtained from any screw can always be resolved to the basis that forms the foundation of the foregoing analysis, and for the reasons stated above this method of comparison is eminently helpful.

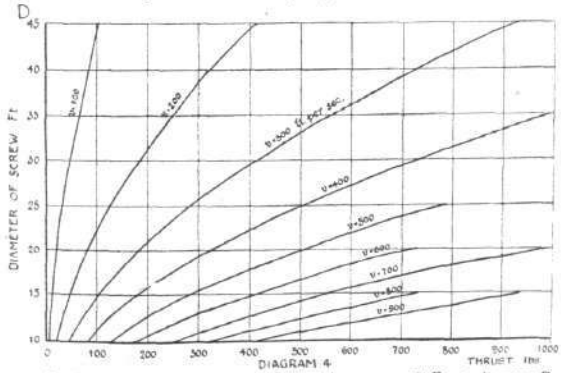
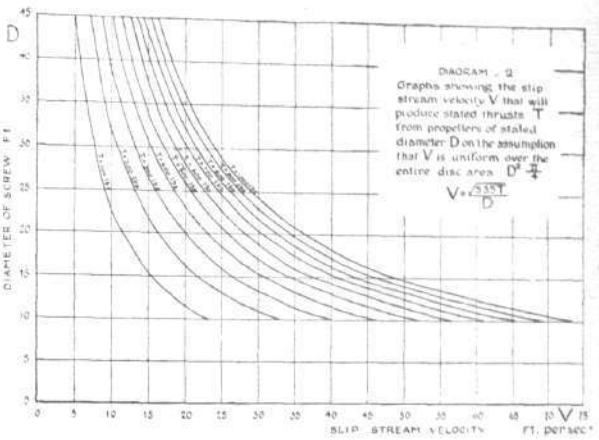


DIAGRAM 4

Graphs showing the thrusts produced by screws of different diameters D operating at different tip speeds V under the conditions stated in diagram 3

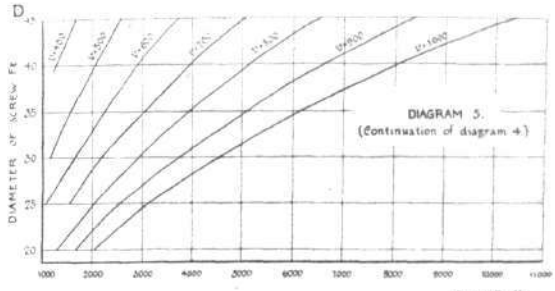
Formula. $\text{Thrust} = \frac{\text{(pitch)}^2 V^2}{5300 A}$



Thus, for example, suppose we consider a case represented by the fourth problem above. The data there given somewhat approximates to actual values that have been obtained. It will be noticed that the efficiency works out at 33 per cent., and if we suppose that the screw was direct driven the entire loss must be accounted for in the screw itself. This brings into consideration the vexed question of skin friction, and in view of the fact that a propeller of 10 ft. diameter running at, say, 1,200 r.p.m. has a tip velocity of some 600 ft. per sec. or 400 m.p.h., it is really a little difficult to know what view to take of the situation, seeing that no actual skin friction experiments have been made at anything approaching these speeds.

It is, however, not necessary to confine ourselves solely to the question of skin friction when seeking for sources of inefficiency in a static thrust screw. The slip stream is certainly not uniform, and it is questionable whether the cross-sectional area is correctly defined by the disc area. The turbulence in the slip stream, including the spiral character of its main current, must necessarily be a cause of lost power, but the numerical values of these factors await the results of practical experiments. For the time being the nearest approximation that can be made is to measure the brake-horse-power of the engine and the thrust obtained, and to work out an all-round efficiency on the basis of the example already discussed.

The examples given above are useful in the design of a screw, as preliminary calculations for the estimate of the minimum revolutions and pitch required. In the absence of more exact practical data it must be left to the personal experience of individual constructors to make such compensations as they may deem necessary to create the effective slip stream that is undoubtedly required to produce the given thrust. As it may be helpful to some in obtaining a general understanding of the problem, we have prepared a few charts and tables so as to illustrate the above conclusions in a graphic manner. Diagram 1 shows the helicopter efficiency throughout a range of slip steam velocities, and it must be understood that the power referred to in the value E is the power actually manifested in the slip stream itself, so that an allowance must be made for screw inefficiency. Thus if the transmission and screw losses are 33 per cent. the overall helicopter efficiency will be one-third of the value obtained from the graphs. Thus suppose the graph indicates an efficiency of 60 lbs. per h.p. this will be the



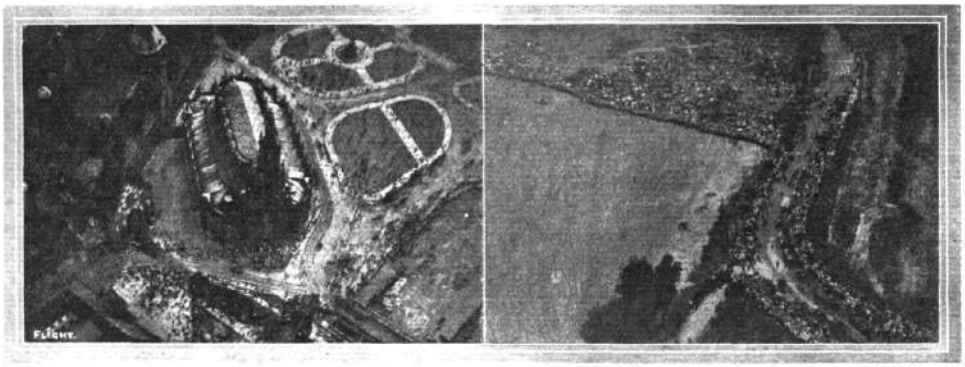
equivalent of 20 lbs. per b.h.p. when the power to which the thrust is equated is the brake-horse-power of the engine. In Diagram 2 a series of graphs have been plotted representing stated thrusts; these show, by their intersection with the co-ordinates of the chart, the slip stream velocities corresponding to any given diameter of screw that will be required to produce the thrust. In this case the thrust represents the entire thrust developed by the screw of the stated diameter without reference to the horse-power expended. In order to find the horse-power it is necessary to obtain the helicopter efficiency from Diagram 1 and divide the total thrust by that value.

In Diagram 3 the graph represented in Diagram 1 has been re-plotted, so that the base-line now represents the peripheral velocity of the screw, it being assumed that the slip stream has a value corresponding to an effective blade-angle of 5° situated 0·6 of the radius from the axis of rotation. This value of 5° was chosen for reasons that will be apparent later, and is the theoretical angle of least resistance. Regarding the blade of a propeller as the analogy of an aeroplane, the method employed to obtain this angle will be found in FLIGHT, July 9th, 30th, August 6th, and October 22nd. It is, of course, needless to remark that the blade-angle of a screw necessarily varies from root to tip, consequently its best value can only obtain at one particular point. It is rather interesting to note that a blade-angle of 5° situated 0·6 of the radius from the axis corresponds to a pitch coefficient of 0·164 where the pitch is equated to the full diameter. Small blade-angles are apt to be misleading until it is appreciated that they correspond to fairly high pitch coefficients.*

Diagram 4 corresponds to Diagram 2, but is based on the assumptions laid down for Diagram 3. It shows the diameters and the tip speeds that will produce stated thrusts under these conditions. Diagram 5 is merely a continuation of Diagram 4, which had to be plotted on a separate chart owing to the nature of the curves. We would once more emphasise that these diagrams do not profess to show what screws thus designed would give. They are merely a basis by means of which practical results can be more readily compared with theory in order to obtain some sort of idea of the manner in which any particular screw is working. It must never be overlooked that in order to obtain a certain thrust from a screw it is absolutely essential to create and maintain a slip stream; these diagrams and the general calculations illustrate limiting theoretical conditions. Also, we would again remind our readers that the scope of this article is entirely confined to the problem of creating and maintaining a *static* thrust, and does not in any way deal with the ascent of a helicopter in the air.

* Most engineers characterise a screw by its diameter and pitch coefficient, the coefficient being the pitch in terms of the full diameter. In aerial screws it is a moot point how the pitch should be measured, but in the above article the effective pitch as realised in the slip stream velocity is always meant.

(To be concluded.)



AIRSHIP AND BALLOON NEWS.

THE VOYAGE OF "PARSEVAL VI" FROM BITTERFELD TO DRESDEN.—A couple of Snaps from the Airship. On the right the crowds on the Heller and Königsbrückerstrasse, and on the left the Dresden Catholic Hofkirche and the Theaterplax are seen.

Willows Airship in a Tree.

HAVING been completely repaired, the Willows airship "City of Cardiff" was brought out of its shed at Lamotte-Breuil on Sunday morning with a view to a cruise over to Issy. While undergoing a preliminary trial, however, the airship was caught by some tall poplar trees and slightly damaged, although this was not sufficient to prevent Mr. Willows from getting his airship back to its shed unaided when the wind had dropped a little.

Gordon-Bennett Balloon Race.

IN connection with the recent Gordon-Bennett balloon race, the distances travelled by each competitor have now been verified by the American War Office, with the result that the following revised list of distances has been issued. From this it will be seen that the world's record for distance was not broken :—

	Miles		Miles
America II (America)...	1,171	Azurea (Switzerland) ...	756
Dusseldorf II (Germany)	1,131	Ile de France (France) ...	722
Germania (Germany) ...	1,079	St. Louis (America) ...	522
Helvetia (Switzerland)	826	Condor (France)	413
Harburg (Germany) ...	766	Million Population (America)	317

Aero Club of America's New Officers.

IN our last issue we were able to give the result of the election for President of the Aero Club of America at the annual general meeting, and we now supplement this with the names of the new committee. The full list is as follows :—

President—Mr. Alan A. Ryan. Vice-Presidents—Messrs. J. C. MacCoy, D. H. Morris, James A. Blair, jun. Members—Messrs. C. F. Bishop, J. A. Blair, C. Z. Edwards, Lyttleton Fox, L. Gillespie, R. Hawley, W. Miller, MacCoy, D. H. Morris, Alan A. Ryan H. Valentine, Major Samuel Reber, A. B. Lambert, F. Zahn, Lawrence Rotch, Wanamaker, Joyce, Russell, MacCormick, Twining.

The Santos Dumont Monument.

IT will be remembered that some time ago the Aero Club of France proposed to put up a monument at Bagatelle to commemorate M. Santos Dumont's first flight there. The Municipal Council of Paris, however, opposed the erection of any monument in the Bois de Boulogne. It was then proposed to place the monument in front of the Porte Maillot Station, but since this idea was mooted the commune authorities at Neuilly have offered a site on their territory in close proximity to the spot where Santos Dumont carried out his first series of experimental flights, and it is probable that this offer will be accepted, and that the memorial will be erected there.

CORRESPONDENCE.

**** *The name and address of the writer (not necessarily for publication)* MUST *in all cases accompany letters intended for* ***insertion,*** *or containing queries.*

Correspondents communicating with regard to letters which they have read in FLIGHT, would much facilitate ready reference by quoting the number of each such letter.

NOTE.—*Owing to the great mass of valuable and interesting correspondence which we receive, immediate publication is impossible, but each letter will appear practically in sequence and at the earliest possible moment.*

CLASSIFICATION OF AEROPLANES.

[907] I certainly consider Mr. Twining's idea an extremely good one, but I should also like to see it considerably amplified and extended. If this could be properly done one line of symbols would tell one more about a machine than a page of print. In the first place the numerals 1, 2, 3, should only be used for the main planes, E being the symbol for an elevating flap, and R for a rudder. The tail of the machine would become either L or N, according as it is cambered and weight carrying, or what is known as non-lifting. As in the case of the Farman the tail is biplane it would be L^2, and as it has also two rudders under or between these planes it might be written (L^2, R^2), to show that these four planes are all combined. Again, a small letter might be placed in a bracket after the numeral indicating the main planes to show how stability is attained. Thus (w) = warping, (a) ailerons between planes, (f) flaps to wing tips, (d) dihedral, (c) side curtains, and (s) screening action as in "Neale VII." And lastly the power of the engine placed after a stop at the end of the whole affair. A biplane elevator is E^2, but a divided one, as on the Cody machine, E^2. The tail of Mr. Macfie's biplane is (LR_2^2), indicating the presence of the four rudder planes. I append a list of some well-known machines, with their formulæ :—

Farman	...	$E - 2(f) - p - (L^2R^2)$ E. 50.
Blériot ...	...	*i.e.* $o - p - 1(w) - (LE_2) - R$. 25.
Demoiselle	...	$o - p - 1(d\,w) - (NR)$. 25.
Curtiss...	...	$E^2 - 2(a) - p - (NR)$. 40.
Neale VII	...	$E - (2(s)\,R^2) - p - LE$. 40.
Antoinette	...	$o - p - 1(d\,w) - N - (E_2R_2)$. 60.
Cody ...	...	$E_2 - 2(a) - p - (NR)$. 80.
Old Voisin	...	$E_2 - 2(c) - p - (L^2R)$. 60.

Though this may look clumsy at first, yet it is easy enough to master, and is then by far the simplest means of giving the description of any machine.

I must apologise for the length of this letter, but my excuse must be the great interest I take in aviation.

Cambridge. R. M. HAINES.

[908] Having read Mr. Twining's letter (880) on the classification of aeroplanes, and agreeing with your note on the same, I beg to send you particulars of a system of what may be called a shorthand representation of aeroplanes by means of letters. I use the initial letters of the following words in the order in which the parts appear in the machine, starting from the front, viz., sustaining, horizontal, and vertical (planes), elevator, aileron, rudder, motor, propeller, chair, tail, and perhaps length, weight, fuselage, and undercarriage. By sustainers I mean the large main-planes, the next two are relatively smaller, and these three are fixed, the next three being movable. V and R are the only vertical planes, and V is seldom used, except in the tail; but I think M. Laborie's accident at Burton, which seemed to happen through a side-skid of his biplane, might have been prevented had he had one between his main-planes. Figures may be used after each of these to denote the number, and in the case of S only the letter may be omitted for biplanes and triplanes, the figure 2 or 3 remaining. Letters are placed close together when the parts they stand for are together or underneath, but when separated along the length of the aeroplane a hyphen or dash denotes this. T is vague, and denotes generally H and R, but sometimes V and A also, and sometimes two of each, but is very useful for type formulæ, in which M or C may be also omitted; fuller formulæ should not use it. C_2 denotes a passenger-carrier, C_3 that there are seats for pilot and two passengers. These full formulæ may be expanded into specifications by affixing after each letter the number, then the span or height, and last the chord, or width, or length, with the usual × sign between, and a label following in small letters to denote ft., dms., lbs., kilogs., h.p., name of motor, with number of cylinders, &c., and then L, W, F, U will often be useful at the end. For instance, S 105 × 25 + 70 × 25 dms. denotes the sizes of the two unequal main-planes of the larger Farman in decimetres. A Blériot would be denoted for type P S–T; for fuller formulæ, P S C–H A R. A Farman would be E–2P–T and E–C S 2P–H_2 R_2, respectively. The Valkyrie is H E–P S R for type, and for fuller formulæ H E–C_1 M P S R_2, and with specification H 14 × 3 ft. E 8 × 2½–C_1 M 30-h.p. Green P 7 S 34 × 6 A 2 × 5 × 2 R 2 × 5 × 2 ft. L 22 W 520 lbs. (see FLIGHT, October 1st). Where planes, motor, &c., are above one another they may be written so, but for the Valkyrie, E being close to H must be below it or would be replaced by A.

Compared with Mr. Twining's plan this is nearly self-explanatory, using initials instead of unlabelled figures; his hyphens seem to have no meaning, though he uses two sizes. This does not use symbols for something not there, and it is adaptable to a fairly detailed specification of every part except the fuselage and undercarriage.

Burton-on-Trent. C. J. ROBINSON.

VERTICAL *VERSUS* HORIZONTAL CONTROLS.

[909] Over a year ago I designed the biplane I have at Southport, and to avoid Messrs. Wright's claims I dispensed with *struts, rudders, ailerons* (or warping devices).

I believe my biplane is the only one without struts, and I believe I am the inventor of the first machine to employ vertical in place of horizontal stabilisers.

The account of the Neale biplane about these controls is a proof my design is sound, for which, of course, I feel gratified; as my machine has yet to fly, I have not been able to swear to the efficiency of such control. I was burnt and my machine destroyed by fire in April. The reconstruction and engine troubles have taken up the intervening time, but I hope to have a decent trial next week.

There is a great saving of weight in my design, which I have put into strengthening other parts. Then I have the cycloplane tail and gearing for twin propellers, and water-cooled engine, which all means weight, but with twin propellers, and the disposition of the same relative to pilot I get greater comfort; it is like sitting in a drawing-room for what little wind the pilot experiences, as the wind is all drawn into the propellers, and away from the pilot.

I have been too busy to reply to some of your cycle-aeroplane and cycloplane correspondents. One I noticed said "anybody can make 'cycloplanes,'" and I hope none of your readers will be led astray by such an unwarrantable remark, as I hold two sealed patents for them; at the same time I can assure your readers that they will find it much cheaper to buy a cycloplane than to make one.

Southport Aerodrome. JOHN GAUNT.

CYCLOPLANE.

[910] I am making a cycloplane. The main plane is 12 ft. long; elevator, 6 ft.; length, 14 ft. Starting at the top of a hill I should pedal a little, and then adjust the elevating plane; but this would not keep the cycloplane up for long. What I want is to have a motive power to keep it up. Can you suggest something that would do?

Royston. G. H. BATEMAN.

[The only thing to fit to the cycloplane would be a petrol engine, and then there would apparently be no need to have the cycle. It would be much better to practise gliding on the lines followed by the Brothers Wright if there is any suitable place for this in the locality.—ED.]

TWO-STROKE ROTARY ENGINE.

[911] Having read a good deal lately about the different kinds of engines in your correspondence pages, I hope you will be able to publish my letter. I have lately perfected the plans for a rotary motor of the "Diesel" type; also automatic stability, and various other ideas. The motor is simplicity itself, having no electric appliances, no crank-shaft, no valves; indeed, there is hardly any parts for the machine to go wrong in any way whatever. Having no crank-shaft nor cylinder-ends, I claim to have overcome the difficulty of these high-compression engines. It also works on the latest engine practice, the two-stroke principle. The other ideas are also as simple, and I go as far as to guarantee every one of them to work. I wish to put them forward to any firm, club or private person who in return will teach me flying, &c. These ideas are not those of a "crank," but those of an engineer, and will be found, down to the minutest detail, to be absolutely perfect. Will any person or persons who are interested in these please write to me, in strictest confidence?

Appleby. JOSEPH J. BLAND.

THE C.R. BIPLANE.

[912] We note in the issue of FLIGHT for November 19th particulars and illustrations of the C.R. biplane. It will be observed that one of our Alvaston 30-h.p. type engines supplies the motive

power, and from what we saw during a visit of the performance of their machine, on a ground of absurdly restricted area, there is no doubt that, given a decent flying ground, very successful results could be obtained.

The present ground, closed in as it is practically all round, necessitates a very prompt lift, attended with considerable risk, or a mere hop, and the available space is covered.

When a better position is found some good flying should be obtainable, and we wish Messrs. Chittenden and Robinson the success merited by their perseverance.

Derby. ALVASTON MOTORS.

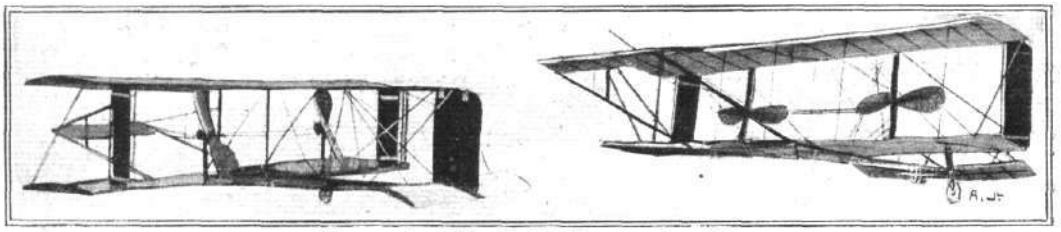
THE NEALE CONTROL.

[913] I am very much interested in Mr. Neale's (new) system of control for aeroplanes, and am, therefore, taking the liberty of writing you in connection with same. Mr. Neale may be interested to know that, although the Neale biplane is the first full-size machine controlled in this manner, I designed and built a model eighteen months ago, using this principle. The enclosed photographs will serve the purpose of proving my statements, and showing that the machine has not existed on paper only. The two rudders were originally on the trailing edge, but were afterwards shifted to the front edge of main planes, as indicated on the sketch, and the vertical panel at the back was discarded altogether. You will see from the sketch what a strange resemblance my machine bears to Mr. Neale's, although I designed this machine long before Farman adopted a monoplane tail on one of his machines.

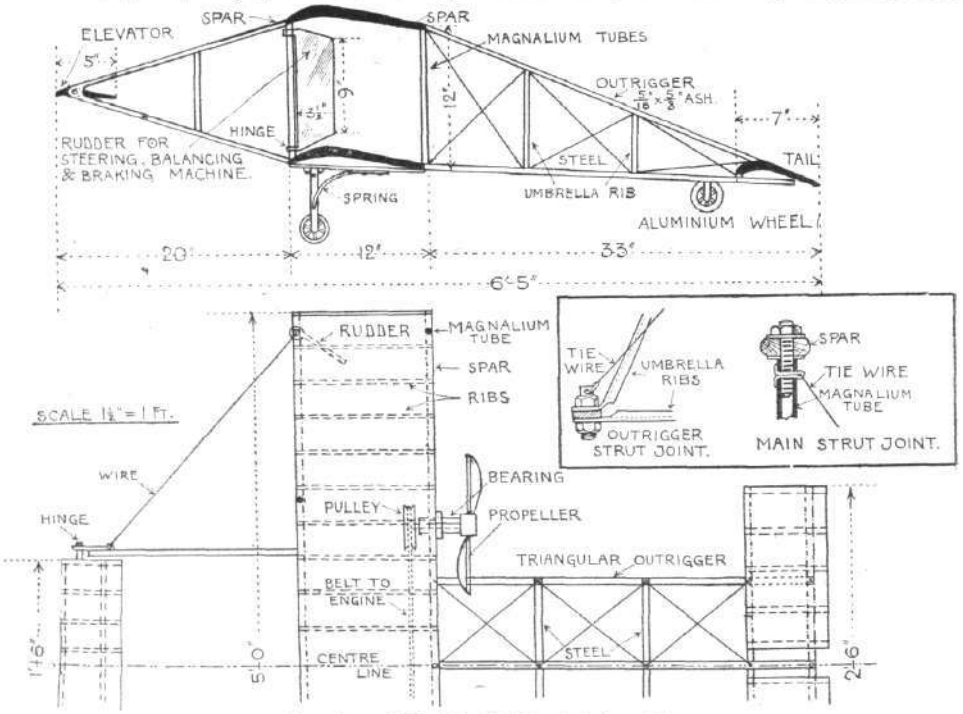
The model itself, which measures 5 ft. by 6 ft. 5 in., was originally intended for a petrol plant, but I made all parts and joints so substantial that it came out rather heavy, weighing 3½ lbs. without any engine. Consequently, it has never been subjected to anything but gliding practice, and flying on rope in strong winds. She glides very well and is very steady.

The struts are made of magnalium tube, and the method of fixing them to spars is clearly shown in sketch. This method comes out rather heavy, but it is practically unbreakable, and lends itself to taking the machine to pieces fairly easily.

The outriggers are of ash, and are strutted with umbrella-rib steel. The main planes are braced with wire in the usual way, with right and left-hand strainers. The tail outrigger bracing is strained in a very simple manner, as shown in detail on sketch. The screwed studs serve the purpose of clamps as well as strainers. With this method of straining I find you can strain the wires to a much greater tension than with the ordinary right and left-hand strainers. The planes are all built up with steam-bent ash ribs, and



Photographs of Mr. Ditchfield's original model.



Drawings of Mr. Ditchfield's original model.

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From the foregoing you will see that Mr. Neale is not the first with this system of control, although he may have worked it out

individually the same as myself. Another use these "screen rudders" can be put to, which you don't mention in your article, is at the end of a *vol plane*, when nearing the ground, both rudders could be brought round at right angles to the direction of travel, exposing a flat face, which would "brake" the machine, and lessen the speed of descent.

I congratulate Mr. Neale on his pluck in trying something new, and not sticking to the old "hum-drum" simply because everybody else does. I trust you will be able to find room for this lengthy letter in your valuable journal, and if Mr. Neale cares to see my model I am open to show it him any time.

Stretford. J. DITCHFIELD.

CRUCIFER AEROPLANE.

[914] I have been much interested of late by your description of the Crucifer aeroplane, and the letter from the inventor which followed it. But the more I consider this system of lateral balancing the less advantage do I see over an ordinary machine with a low c.g. In principle, I think we may take it that the Crucifer aeroplane embodies the ordinary principle of automatic lateral stability obtained by means of a pendulum, with the important modification that the pendulum, instead of being long and comparatively light, is short in the arm, but of great mass, the whole mass of the body, in fact.

But suppose a force of 1 lb., say, applied to the wing-tip at, say, 20 ft. from the body. This will produce a turning moment of 20 ft. lbs. about the centre of the wings. Now when the weight of the body is rigidly attached to the framework it swings from the vertical through the same angle as the wings, until its moment is equal and opposite to the moment of the applied force.

Now when the weight is free to swing the case is almost the same. A resisting moment of 20 ft. lbs. must be produced to maintain stability. Therefore the weight (now in the form of a pendulum) must swing through the same angle as before to produce this moment. Actually it would swing through a greater angle, as its moment must overcome the frictional resistances of the mechanism operating the ailerons. But in this latter case the lag in the action of the ailerons causes the wings to cant through a *greater* angle than before ere stability is obtained.

The underhung body would seem to be unwieldy when turning corners.

Moseley. MAURICE OLLEY.

CAN WE FLY FASTER?

[915] As a constant reader of FLIGHT, I have been greatly interested with your valuable articles entitled "Can we fly faster with less power?"

Surely the boat or cigar-shaped craft possesses many advantages. Mr. Le Maître's excellent letter has made me bold enough to try and add something, if possible, to the remarks already given, viz., that the boat or cigar-shaped vessel not merely presents a smaller friction surface and is probably lighter with equal or far greater rigidity, but, *ceteris paribus*, it also has what to me appears this tremendous advantage, that the lower body or rather bottom of the aeroplane itself becomes a plane and that of considerable magnitude, and, moreover, a plane situated in the direct centre of the line of flight.

Granting this, a reduction in the main planes (as now used) could be made and presumably in the direction of their span, thereby decreasing besides the friction the lateral strain and consequent liability to injury.

I hardly dare to add a suggestion—that the rudders and even the elevator in a "covered" vessel might be so placed as to lie practically flush with her sides and thus lessening the resistance through the air, though capable of being projected when required to maintain the line of movement in the course of flight.

WELL-WISHER.

AERIAL *V.* MARINE PROPELLERS.

[916] With reference to letter No. 813, allow me to suggest that, whereas under water propellers have seldom to work against a current of more than about four knots, an aerial propeller would have to work against a considerably greater current in the air, probably several tens of knots; so that, except under ideal conditions, even supposing that we have got an aerial propeller as efficient as the marine propeller, a boat fitted with an aerial propeller would make little way through the water. The other disadvantages are obvious.

Portsmouth. CECIL J. L'ESTRANGE MALONE.

MODELS.

MODEL AERO CLUB FOR SHEFFIELD.

[917] My attention having been drawn to a letter appearing in your valuable paper of the 12th inst., wherein it is stated that it is proposed to form a model aero club in Sheffield, I hope you will kindly allow me a word in the matter. Your correspondent is evidently not so well informed as some of his fellow model enthusiasts, and he may be interested to learn that the Sheffield and District Aero Club, provided the necessary support be forthcoming, is quite prepared to organise a model section. I think from this it will be understood that there is no necessity to form another society in this city. In conclusion, I should like to state that during the coming year, by catering for every branch of the science and sport, my club hopes to secure the support of all interested persons in the district it represents.

22, Mount Pleasant Road, Sharrow, Sheffield. C. WIGHTMAN, Hon. Sec., Sheffield and District Aero Club.

MODEL FARMAN.

[918] I am sending you a photo of my model Farman, scale 1 in. to a foot.

I fitted it with a model motor, petrol-tanks, and pumps. The propeller is steamed to shape from a thin piece of American white

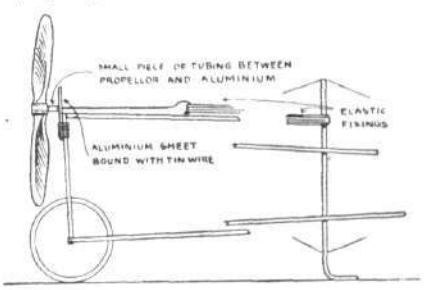
wood, and then polished. The framework is made of white pine, with red deal struts, and braced with strong thread.

The Farman is of the latest type, with short span lower deck. It weighs complete 7½ ozs.

Stourbridge. H. R. GUEST.

MODEL DEMOISELLE.

[919] In answer to T. Lockett's letter, No. 717, I have made a ½-in. scale model Demoiselle, and found that they are very intricate to make, especially on so small a scale.



Enclosed is a rough sketch of how I made the elastic motor; it runs quite well without ball bearings.

I should be pleased to forward a photograph of my model should your correspondent like to see it.

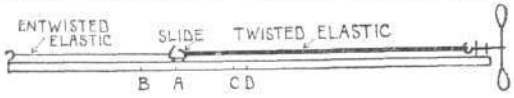
Southall. F. HARRISON.

AUTOMATIC TAIL ADJUSTMENT.

[920] In letter 775 your correspondent, Mr. A. W. Lambourne, suggests making the slackening of the tension of the elastic in models automatically move the planes into a position for gliding. I have been trying a similar system for not only giving compensating effects for the variations in propeller thrust but also for automatically controlling the model in mid-air. So far I have not been successful, but my results may be interesting, as, if they do nothing else, they show the varying stresses which are put on the framework of models by winding up the elastic, so I beg to submit them.

I used the arrangement shown diagrammatically in the figure, the

tension of the power elastic (of which three geared skeins were used) being maintained by a length of untwisted elastic on the other side of a slide with suitable hooks, shown at A. If this elastic is very short, or if it is of many strands, and not stretched much before winding, hardly any travel will be got out of the slide on winding.



It must be of a few strands (or very thin), and consequently tightly stretched before winding is commenced. If this is the case, and A is the position when motor is unwound, the first appreciable motion of the slide when winding up will be towards B (though there is sometimes a very small preliminary motion towards C). This movement is somewhat surprising, but it will continue till knotting begins, when the slide will have reached, say, B, though knotting can be, so to speak, encouraged, and made to take place earlier, when the turning point, B, will not be so far from A. The slide then moves back, and reaches a position about at C, by the time knots are formed all along the skeins. If now the propeller is allowed to run, the slide will move up to D (for about three-tenths of the time of running on my model) and then move fairly steadily back to A, no appreciable movement beyond A to B being noticed (probably because the knots once formed tend to remain). The first movement towards D is probably due to some effect of centrifugal force, and might not be so great on a slower-speed motor.

If after single knotting is complete winding is continued, the slide shows an inclination to move from C slightly towards A, until double-knotting begins, then back, the final position when a few double knots are formed (which I believe is about the permissible number of turns) being somewhere near D. On letting run there may first be a very small motion back towards the propeller, but the chief movements are a little forward, back to D, and then on to A as before. About five-twelfths of the time of unwinding was spent round about C and D on my model before the final forward movement took place, so I came to the conclusion that I could not make the model steer round, dive, &c., in the middle of its flight as I had intended it to do by means of suitable mechanism on the slide. However, this might be managed with a flyer going for a long distance, or with a slower-speed motor.

The gliding adjustment might be done by the final movement of the slide, but I rather think that with the elastic above the stick carrying it, if the stick is fairly flexible, it will have a slight bow-shape when the elastic is fully wound, and get straighter as the tension gets less, thus lessening the angle between the front and back planes as gliding begins, without any sliding mechanism at all being needed.

Wimbledon. B. BRUCE-WALKER.

MODEL CLUB FOR HANWELL.

[921] A few others and myself are desirous of forming a model aeroplane club in this district, and we should be greatly obliged if, by the publication of this letter, you would aid us in bringing our wishes before the notice of those enthusiasts residing in this and the surrounding neighbourhood.

If intending entrants will communicate with me a meeting will be arranged, when election of officials and general details will be arranged.

"Loretto," 17, Holly Park Road, Hanwell, Middlesex. R. R. DRAKE.

TWIN-SCREW MODELS.

[922] If "B. G. D.," Holloway (747), can move his rear plane along the backbone of his model, let him move it forward little by little until he finds the correct position, when the model will glide without dipping. If not, there is no harm in fitting a third propeller, provided he gets the three to work without touching each other.

Glasgow. AMATEUR.

ELASTIC MOTORS.

[923] It would be interesting if Mr. Langdon-Davis would give some account of how the torque of the elastic motors is measured in the very interesting article that appeared in FLIGHT No. 90.

Altrincham. R. M. L.

Stewart, not Steward.

MR. NORMAN S. STEWART wishes us to point out, in regard to his machine at the Stanley Show, referred to by us on page 951 last week, that his name is spelled with a final "t," not "d."

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